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ABSTRACT

The papers presented in this volume report studies on the process of innovation and studies on the process and problems of communicating scientific information to the public. Papers include: "The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovation" by Elihu Katz; "The Communication of Ideals on Innovation in Agriculture" by E. A. Wilkening; "Characteristics of Agricultural Innovators and Other Adopter Categories" by Everett M. Rogers; "An Ordinal Scale for Measuring the Adoption Process" by Robert Mason; "Shannon's Information Theory: The Spread of an Idea" by Randall L. Dahling; "Innovation of Participation in a Management" by Thomas W. Harrell; "Experimental Studies of Communicative Effectiveness" by Jum Nunnally; "Mass Media Censorship and the Portrayal of Mental Illness: Some Effects of Industry-Wide Controls in Motion Pictures and Television" by George Gerbner and Percy H. Tannenbaum; "A Scientific Convention as Source of Popular Information" by Glynn L. Wood; "Two Studies on the Communication of Scientific Information" by Norman McKown; and "Science and the Public Mind" by Wilbur Schramm. (SP)

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FOREWORD

This is the second volume of incidental papers produced during the study made by the Institute for Communication Research of the problems of bringing behavioral science research into use. The study was financed by the Ford Foundation.

The first volume in this series, published in 1961, contained a number of case studies by well-known behavioral scientists and users of behavioral science. There will be at least one more volume after this one, containing some studies of a behavioral science research organization, one or more theoretical articles on the topic of utilization, and some early studies on attempts to map the various fields of applied behavioral science.

The present volume reports some studies done at Stanford, and some papers and studies commissioned elsewhere. The papers fall into two broad groups, one on the process of innovation, the other on the process and problems of communicating scientific information to the public.

The opening paper, by Prof. Elihu Katz, of the University of Chicago, contrasts two studies of innovation. One treats the process by which hybrid-corn seed gained acceptance among farmers in two Iowa communities; the other, the process by which a new "miracle" drug came to be accepted by physicians in four communities. Both studies were designed with sociological variables in mind, and the similarity of their findings gives strong support to a number of empirical generalizations concerning the innovation process.

Following Professor Katz's paper are three studies of agricultural innovation. Professor Wilkening, of Wisconsin, sums up much of the thinking of scholars on agricultural innovation. Professor Rogers, of Ohio State, studies the characteristics of farmers who can be identified as innovators, or as early or late adopters. Professor Mason, of Oregon State, applies Guttman scaling to field studies of agricultural innovation, and finds that the stages in the adoption process are sometimes as postulated by rural sociologists, sometimes not, the difference apparently arising from differences in the products under adoption.

Mr. Dahling's paper is an attempt to map the lines of adoption of Shannon's mathematical theory of information, by the ingenious device of studying the footnotes in articles using the theory and published during the first eight years after Shannon's 1948 article.

The final paper in the first section of the book, by Professor Harrell, is a field study of a large corporation's attempt to introduce a new management practice. The innovation met with considerable success, and the amount of change in supervisory personnel was a reflection of the encouragement they got from their superiors.

The first two papers in the second group of studies grew out of the large Illinois study of the problems of communicating information on mental health and mental illness to the public. Many of the results of this study have been reported in Professor Nunnally's book, Popular Conceptions of Mental Health. Professor Nunnally's paper in the present volume reports some of the results of his experimental studies on this topic, including challenging postulates on when it may be better not to correct erroneous public beliefs. The paper by Professors Gerbner and Tannenbaum represents part of a study of the reasons why the mass media carry what they do on mental health and illness.

Mr. Wood's paper reports a study of the newspaper coverage of an American Psychological Association convention, attempting to get at the reasons why reporters covered, and newspapers printed, what they chose to cover and report from the more than 400 papers and panels delivered at the meeting.

Professor McKown's two papers are reports of experimental studies on aspects of the communication of science to large audiences.

The final paper in the book, which makes a start at mapping the distribution of science knowledge in the American public, is based on an intensive study of one community made by the Stanford Institute for Communication Research, and some national surveys by the Survey Research Center of the University of Michigan.

Wilbur Schramm

Institute for Communication Research
March, 1962

I.

STUDIES OF INNOVATION

THE SOCIAL ITINERARY OF TECHNICAL CHANGE:

Two Studies on the Diffusion of Innovation

ELIHU KATZ

Dr. Katz is associate professor of Sociology at the University of Chicago, and co-author with Paul Lazarsfeld of the book PERSONAL INFLUENCE. *This paper, originally written for the present project, was published in substantially the same form in* HUMAN ORGANIZATION *(20, 2, Summer, 1961).*

THE SOCIAL ITINERARY OF TECHNICAL CHANGE: TWO STUDIES ON THE DIFFUSION OF INNOVATION

by

Elihu Katz (1)

Rapid social and technical change is the hallmark of modern, urban society. The last few years, for example, have seen an upturn in the birth rate; an invasion of small, foreign-made automobiles; the triumph of the hula hoop; the rise and fall of the sack dress; the widespread acceptance of antibiotics and tranquilizers; and so on. Despite all of this, there are surprisingly few studies of the diffusion of innovation in the sense of tracing the movement of: 1) a given new practice; 2) over time; 3) through specific channels of communication; 4) within a social structure. This is all the more remarkable given that one would be hard put even to define various fields of behavioral research without reference to the process of diffusion. Marketing, for example, obviously, has to do with the diffusion of products; anthropology has to do with the transmission and change of culture; sociology is concerned, among other things, with the consequences of technical change, or with the spread of fads and fashions. Yet, these traditions have tended to ignore the itinerary of change in the sense in which the diffusion process is defined above.

The aim of what follows is to compare two studies which have made a start in this direction. The one, by Bryce Ryan and Neal Gross, is a study of how hybrid seed corn gained acceptance among farmers in two Iowa communities;(2) the other is a study of how doctors in four communities responded to the availability of a new "miracle" drug. (3) Despite the seeming difference between a new seed and a new drug, and between farmers and doctors, the two studies will be seen to be comparable at many points, with respect both to research design and research results.

These studies also represent a noteworthy convergence of two traditions of social research which have had virtually no contact with each other. The hybrid-corn study is one of the earliest products of that branch of rural sociology which has concerned itself--for the last fifteen or so years--with the study of factors affecting the acceptance of new practices recommended to farmers for adoption. The drug study stems, ultimately, from the tradition of research into the effects of mass communication. (4) The two traditions have in common a concern with what has been called "campaigns"--attempts, in the short run, to change opinions, attitudes, and actions. (5) In this sense, a voting campaign, or a campaign to reduce prejudice, or a marketing campaign are similar to the campaign of an agricultural experiment agency to persuade farmers to adopt some innovation. Yet, despite this similarity, the two traditions have shown little interest in each other. The key to the vast gap which has separated them is, surely, the different images of society which they have held. Mass communications research has tended to envision society as an audience of isolated individuals, hooked up to the mass media but not to each other. Indeed, the mass media are the very symbols of the atomized mass society. Rural sociology, on the other hand, conceives itself as being located near the opposite end of the "Gemeinschaft-Gesellschaft" continuum.

Very recently, however, mass communications research has begun to revise its image of the audience. A series of studies in the last few years has revealed not only that modern, urban society is not as individuated as had once been assumed but that the connections among family members, colleagues, and the like, have an important share in the communications process. (6) It is this concern with interpersonal processes which is beginning to forge a link between the two traditions of communications research being considered here. (7) Nevertheless, the drug study was completed only a few years ago without any real awareness of its many similarities to the study which had been undertaken by Ryan and Gross almost fifteen years before.

This article has two parts. The first part is concerned with the design of the two studies. It is an attempt to illustrate the research strategies which are appropriate to research on the diffusion of innovation, and the main variables which must be taken into account. The second part of the article compares some of the findings of the two studies.

The Design of the Two Studies

The design of the two studies can be compared most usefully, perhaps, with respect to the basic elements already enumerated: 1) a given new practice; 2) time; 3) channels of communication; and 4) social structure. Each of these elements will be considered in turn.

A given new practice

Each study concentrated on a single new product. Hybrid corn seed emerged from its experimental stage in 1927 and had been almost universally adopted ten years later in the two communities studied. Gammanym, the newest member of a family of modern "miracle" drugs, became available to physicians in the early 1950's and achieved almost total acceptance in less than two years. (8)

The two products are far more comparable than they might appear to be. First of all, they both came highly recommended by competent scientific authority. They are both of central importance to the groups for whom they were intended. What is more, both seeds and drugs are the sorts of products whose effects can be measured with a rational yardstick which enables users to see for themselves, more or less, whether the innovation serves better than its predecessor. This is quite different from, say, fashion changes in clothing.

Another characteristic shared by hybrid corn and gammanym is that both could be accepted in installments. A farmer, for example, could experiment with the new hybrid seed in a small fraction of total corn acreage, just as a doctor could decide to try gammanym, initially, on only one or two patients. This is quite different, obviously, from take-it-or-leave-it innovations, like an air conditioner or a new car.

Still another important similarity between the two innovations is that both were essentially modifications of products with which farmers and doctors, respectively, had had considerable experience. Adoption of these innovations, then, required only relatively minor -- but still not insignificant -- changes in patterns of thought and action. Contrast these "substitute" products, for example, with the study of a "campaign" waged in a rural Peruvian community to gain acceptance of the ostensibly simple practice of boiling water before drinking it, where acceptance required a radical change in the traditional concepts of health and illness as well as a change in the rhythms of food preparation and of work within, and outside, the household. (9)

The two innovations share still other similarities. One of the most important of these has to do with the fact that differentials in wealth, or in economic profitability, do not seem, a priori, to be of major relevance in determining response to the innovation. In the case of hybrid corn, Ryan and Gross explain that no farmer cited the price of seed as a reason for delaying adoption of the innovation, nor was there any reason to believe that the increased return from hybrid corn would be disproportionately greater for operators of larger farms than of smaller ones. (10) In the case of gammanym, of course, it is the patient, not the doctor, who pays for the drug and thus doctors might all be expected to be equally likely to be the first to try the new drug.

This is not to say that there are no differences between the two products, or that the above enumeration necessarily catches up the most crucial dimensions. It can only be surmised that some of these dimensions -- plus others like them -- may well affect diffusion patterns. It is clear, at any rate, that any attempt to develop a comparative study of diffusion must incorporate a more systematic "content analysis" of the variable characteristics of innovations. Moreover, this must be done "functionally"; that is, the innovation must be characterized with respect to the patterns of thought and action of the people to whom it is directed. (11)

Time

The second element of the diffusion process in terms of which the two studies may be compared is the element of time. In both studies, "acceptance" of the innovation was operationally defined as initial use of any amount of the product.

Notice that both studies can assign a date to initial acceptance and that it is the element of time, perhaps more than any other, which makes the study of diffusion possible. In the case of the farmers, the year of first use of the new seed was determined by asking the farmer. In the case of the doctor, this was done by means of an audit of prescriptions on file in all pharmacies in the four communities which were studied. The month in which each doctor's earliest gammanym prescription appeared was counted as the date of his "acceptance" of the new drug. Thus, the drug study had the unique opportunity of obtaining an objective measure of past performance by virtue of the availability of the written record of prescriptions, while the hybrid-corn study relied on subjective recall. (12) But, what is of fundamental importance is that both studies devised a method of measuring time; this is the major key to their comparability.

Channels of communication

Both studies rely, at least in part, on the respondent's own ability to "reconstruct" the sequence of factors which influenced his decision. Yet, it is by no means clear how much trust can be placed in this ability--particularly when it concerns a decision which was made months, sometimes years, before. Essentially, then, there are two methodological questions which both studies confront at this point: 1) Whether respondents are at all capable of reconstructing the elements which go into the making of their decisions; and, if so, 2) whether there is not a time limit on this ability.

Again, the hybrid-corn study places more faith in respondents' testimony than does the drug study. Ryan and Gross say only that:

> . . . the channels through which farm operators first learned of the new seed were undoubtedly more complex than the farmers themselves realized.

But they deal with them at face value nevertheless. And, in fact, a number of their findings with respect to farmers' use of the channels of communication have been corroborated by other studies.

The drug study, on the other hand, is much more skeptical. More explicitly than the hybrid-corn study, the drug study makes an attempt to use more objective means to uncover the relevant influences operating on the decision to adopt gammanym. Along with the respondents' own testimony as to what influenced them, that is, the drug study analyzes variations in time of adoption as a function of the channels of communication to which respondents are generally exposed. This is a step backwards, in one sense, since the correlation between, say, amount of journal reading and time of adoption raises problems of interpretation which need not be raised in the case of subjective retrospection. Similarly, it is impossible to get at the sequence of media use by means of this method. On the other hand, however, despite the added risks of inference-making, there is reason to believe that this method produces results which would otherwise go undetected. (13)

Among the channels of communication are included such impersonal media as journals, direct mail advertising, and the like, and such personal ones as salesmen and colleagues. As has already been pointed out, both studies made special provision for taking account of the possible influence of neighbors and colleagues in the decision to adopt.

Social structure

Social structure figures in a variety of different, although interrelated, ways in the sociological study of diffusion. Most basic, perhaps, is the fact that social structures serve as boundaries within which innovations spread. Thus, one can compare the extent or the speed or the sequence of penetration of a given innovation within different neighborhoods, or social classes, or adolescent gangs. (14) Differential rates of penetration can then be accounted for in the light of other elements which distinguish among social structures; social norms, for example, or different degrees of social integration, or status variations within some larger social structure.

Within a given structure, of course, individuals can be differentially "located" with respect to their statuses, relative integration, or the like. One can then examine the different responses to innovation characteristic of individuals in varying structural locations. (15)

Finally, social structures may also be seen as networks of interpersonal communication and, in this sense, obviously, the concern for channels of communication and for social structure coincides. Given this kind of social network, that is, one would want to trace the social itinerary of an innovation as it proceeds over time. (16) A child may not be able to "reconstruct" how he got the measles, but locating children with respect to their social structures--schools, friendships, community centers, etc.--will provide a good picture of the process of "social contagion," the relevant networks of communication within a structure and the comparative importance of different structures (school vs. community center, for example).

Rather than interview a random sample of doctors, it was decided, in the drug study, to interview all doctors for whose practices the new drug was relevant. In addition to the usual questions concerning personal attributes, attitudes, communications behavior, etc., each doctor was also asked to name: 1) his three best physician friends; 2) the three or four physicians with whom he most often finds himself discussing cases or therapy; and 3) the colleagues on whom he most frequently calls when in need of special information or advice on questions of drug therapy. Thus, each doctor could be located with respect to the structures of friendship, case discussion, and advice, and within each of these structures, the doctor could be rated in terms of: 1) his relative integration or popularity--that is, how many of his colleagues designated him, and 2) his particular network of association--that is, which of his colleagues named him. Thus, sociometry provides one means for mapping the structure of interpersonal relations in order to determine their impact on individuals occupying different positions within them and to examine their role as potential paths for the flow of innovation.

The hybrid-corn study also interviewed all the members of the two communities which were studied. But there is no sign that this aspect of the research design was put to use in determining the structure of social relations. Instead, information was simply collected from all community members as if they were unrelated respondents in a random sample. Attempts to map individual location within the social structure were made in more conventional ways. Respondents were asked to indicate the organizations to which they belonged, the extent of their contacts outside the community, the number of neighbors whom they visited, etc. Nevertheless, the authors of the hybrid-corn study are keenly aware of the potential relevance of social relational variables and, indeed, explicitly regret not having designed adequate measures of social participation:

> . . . due mainly to the great difficulty in devising them. (17)

The Findings of the Two Studies

Having noted the similarities in the design of the two studies, let us now compare some of the findings. This second section of the article will be concerned with the extent to which the empirical generalizations emerging from one study find support in the other. For, in a very real sense, these studies may be viewed as replications of each other.

We will proceed, point by point, to analyze their similarities and differences. But it will become apparent readily that there is a theoretical thread which connects these diverse points; it is a concern for the processes of interpersonal influence which figured so prominently in the diffusion of these two innovations.

1. The rate of diffusion

If the cumulative proportion of acceptors of hybrid seed is plotted over the ten-year period from its earliest adoption to the time when virtually all community members had tried it, the curve is S-shaped, indicating that: 1) there was an early period of adoption when a few pioneering farmers gradually tried the innovation; 2) a rapid middle period when many people adopted close upon each others' heels and 3) a late period when even the die-hards gradually accepted. The S-shaped curve has been associated traditionally with diffusion phenomena and has been assumed to imply not only that there are characteristic stages in the diffusion process but, more important, that there is intercommunication among the population of adapters. Such curves suggest, that is, that the fact that others have adopted is itself a source of influence making for further adoption. For example, if the "pioneers" who adopt an innovation immediately upon its appearance each tell their friends about it, and these friends subsequently tell their friends, and so on, the resulting curve of diffusion would look something like the curve in Figure 1.

Ostensibly, the curve of diffusion of gammanym (Figure 2) looks different. It shows that there was a rapid spurt of adoption in the months immediately following the release of the new drug which is described by the steep, nearly straight line reaching until the eighth month, during which period about two-thirds of the doctors wrote their earliest prescriptions. The curve tapers off thereafter and in the remaining eighteen months another 20 per cent of the doctors began using it, bringing the cumulative total of doctors who had tried the new drug to about 90 per cent. It is fairly clear that this curve lacks the tentative phase characteristic of the early days of hybrid corn. Perhaps this difference between the two curves reflects the greater conservatism of Iowa farmers as compared with the doctors.

What is really important about these two curves is not at all accessible to the naked eye. For, despite manifest differences between them, the fact is that the drug study provides strong support for what the corn study could only hypothesize: that interpersonal networks of communication have an important share in the diffusion process. This can be seen in Figure 3 where the cumulative curve of gammanym diffusion is plotted separately for different groups of doctors, classified according to the number of choices they received as friends.

Compare the two extreme curves. The curve for the most "integrated" doctors continues steeply upward almost to reach its peak in the eighth month, while the curve for the "isolated" doctors rises at a constant rate. What is

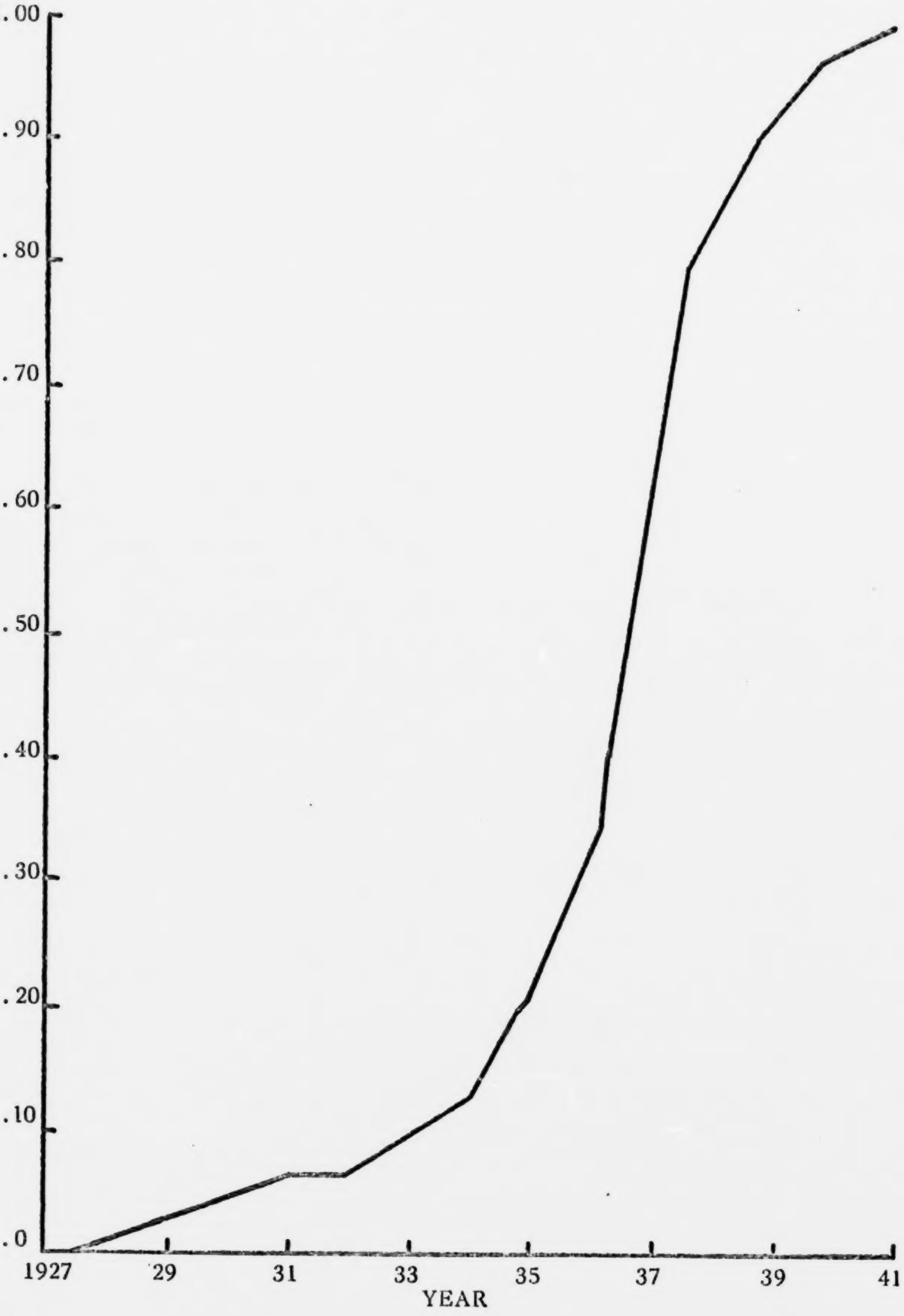

Figure 1. Cumulative percentage of farmers accepting hybrid seed during each year of the diffusion process. (Adapted from Bryce Ryan and Neal Gross, Acceptance and Diffusion of Hybrid Seed Corn in Two Iowa Communities, p. 672).

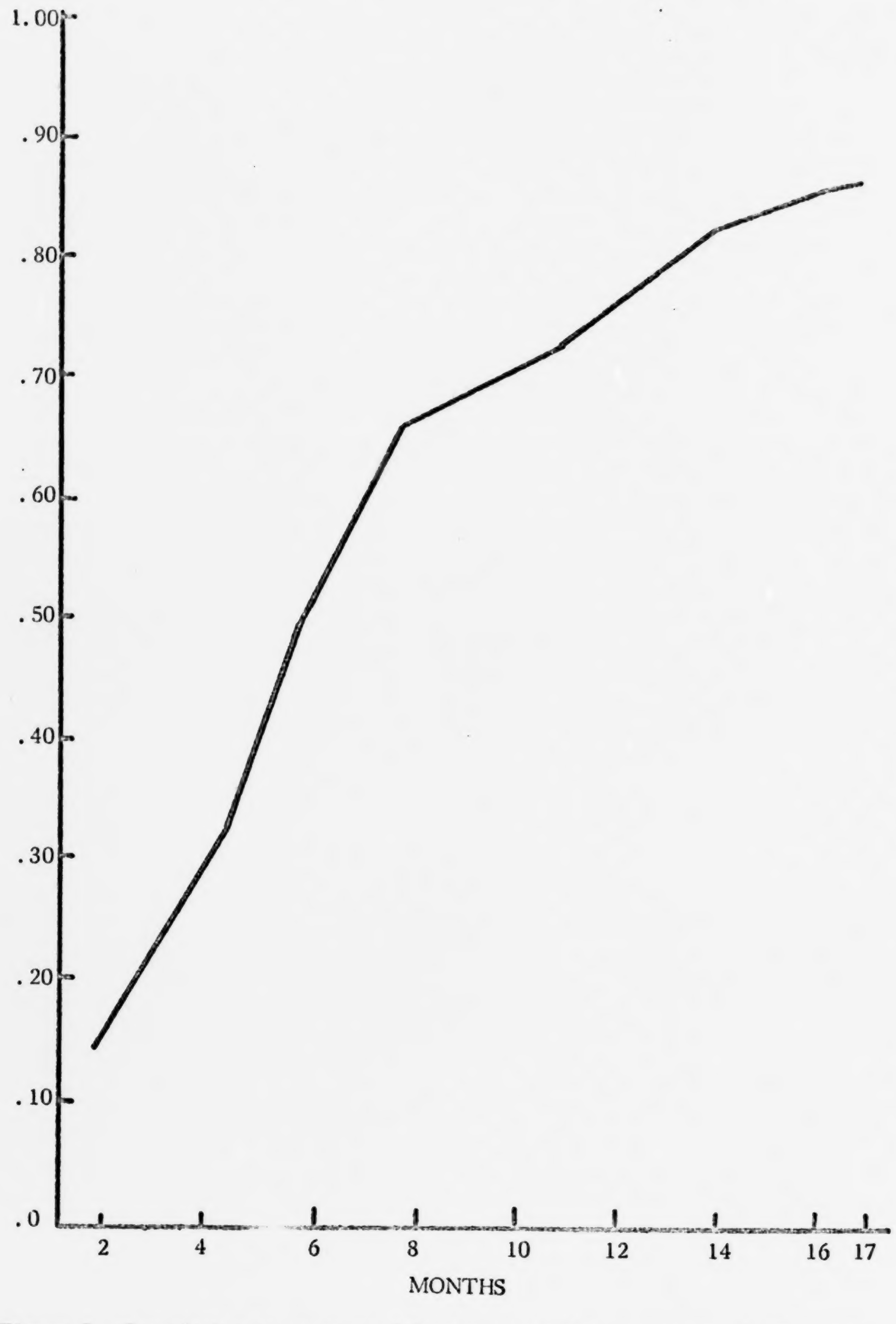

Figure 2. Cumulative percentage of doctors accepting gammanym in the communities studied over a 16-month period (N=125).

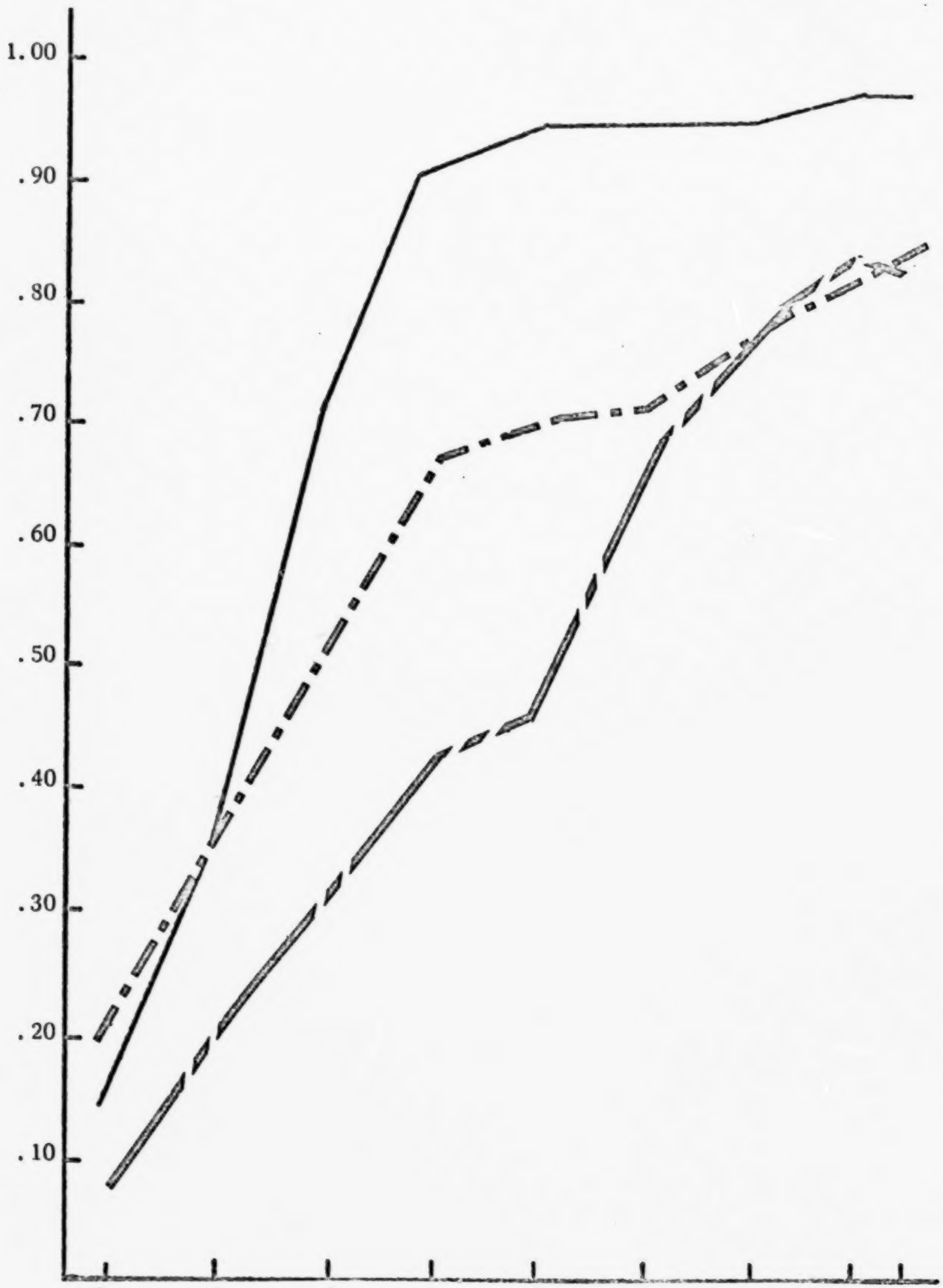

Figure 3. Cumulative percentage of doctors accepting gammanym over a 16-month period by number of friendship choices received. (19)

interesting about this is the fact that the curve for the "integrated" doctors can be closely approximated by a "chain reaction" model which grows as a function of the number of doctors who have already adopted. On the other hand, if one postulates a curve made up of a sequence of individual adoptions uninfluenced by interpersonal communication, one would approximate the curve actually obtained for the "isolated" doctors. This latter curve might result, for example, from some constant stimulus -- say, advertising -- operating each month so as to influence a constant proportion of those who have not yet adopted. This would be the case, for example, if 15 per cent adopt during the first month, and 15 per cent of those remaining do so in the second month, and so on. (18) Unlike the social process of adoption, those who adopt in any given month are uninfluenced by those who adopted before they did.

In other words, the drug study argues that the curve of gammanym adoption is really made up of two quite different curves. One of these -- that of the "integrated" doctors -- resembles the S-curve of diffusion of hybrid corn in that both curves can be approximated by theoretical models based on the assumption that diffusion is a product of interpersonal influence. Thus, doctors who are close to their colleagues are, by the same token, also integrated into a powerful network of communication. Doctors who stand outside these relationships are apparently more individualistic (and slower) in their innovating behavior as well.

Diffusion curves are made possible by taking account, in the research design, of time-of-adoption and of social structure (in the sense of setting social boundaries in terms of which diffusion is to be observed). The design of the drug study also called for classifying individuals in terms of relative integration in the social structure. Given these ingredients, it becomes possible to make inferences concerning the over-all importance of interpersonal influence in the diffusion process and its differential importance for individuals who are differentially "located."

2. Innovation on the installment plan

Further evidence concerning the role of interpersonal influence can be inferred from a comparison of the degrees of caution exercised by early and late adopters in their initial trial of the innovation. It has already been noted that both hybrid seed corn and gammanym were not all-or-none innovations. You either purchase an air conditioner or you do not; you cannot begin with one part of an air conditioner, then slowly add more parts if it satisfies you. But farmers could do essentially just that with hybrid seed, and doctors could do it with gammanym. Planting hybrid in a certain percentage of his corn acreage or prescribing gammanym to a certain percentage of his patients, could constitute a sort of experimental trial for each innovator; then, if he were satisfied, he could add more.

This is, in fact, what happened. No farmer planted all of his corn acreage to hybrid in the year he began with the new seed. What is more, as Table 1 reveals, the earliest adopters were extremely conservative in the per cent of their acreage planted to hybrid during the year of their initial adoption.

Table 1

Median Percent of Total Corn Acreage in Hybrid By Year of First Use

First Use	Per cent of Acreage in Hybrid During First Year
pre-1934	12%
1934	20
1935	8
1936	20
1937	19
1938	25
1939	30
1940	69
1941	54

Adapted from Ryan and Gross, *Acceptance and Diffusion of Hybrid Seed Corn in Two Iowa Communities*, Table 3, p. 680.

Something very similar seems evident among the doctors. By classifying doctors according to the date of their earliest prescription for gammanym and examining the number of gammanym prescriptions written by each doctor during the three-day period which includes his earliest prescription, it is possible to see whether the earliest doctor-innovators, like the farmer-innovators, are more conservative in the extent to which they adopt the innovation. The parallel is evident from Table 2.

Doctors whose initial prescriptions for gammanym appeared in the earliest prescription sampling period (one to two months following the release of the new drug) wrote an average of only 1.5 gammanym prescriptions during the three-day period while those who began in the following two months averaged 2.0 prescriptions, and so on. In other words, the innovators, measured by *time* of adoption, seem to be conservative in the *degree* of their first use of the innovation, while those who are conservative in time of adoption appear to be bolder in their degree of first use.

Table 2

Average Number of Earliest Gammanym Prescriptions
by Month of First Use

Number of Months Between Release of Gammanym and Month of First Use	Average Number of Earliest Prescriptions (3-day period)
1-2 months	1.5
3-4 "	2.0
5-6 "	2.7
7-8 "	2.6

This finding of the two studies suggests that later adopters could depend, in part, on the accumulated experience of the innovators. Ryan and Gross put it this way:

> In a sense, the early acceptors provided a community laboratory from which neighbors could gain some vicarious experience with the new seed over a period of years. (?0)

Thus, again -- and from quite a different perspective -- the empirical findings of the two studies appear to point to the relevance of interpersonal relations for the diffusion of innovation.

3. Information is not enough

So far, we have been reporting essentially behavioral data relating to time-of-adoption, to relative integration, and to extent of first use of the two innovations. From these data, inferences have been drawn concerning the workings of interpersonal influence in the diffusion process. Now we turn to the respondents' own testimony concerning their communications behavior. That part of the research design which is concerned with the channels of information and influence becomes relevant here.

One of the first questions which deserves to be asked in this connection is whether later adopters adopted late for lack of knowledge concerning the existence of the innovation. The evidence of both studies points to a negative answer to this question.

Ryan and Gross distinguished in their interviews between the diffusion of information and the diffusion of adoption. They asked farmers to indicate the year in which they first heard of the new seed along with the year in which they first adopted it. While they found that it took about thirteen years for news of the innovation to reach every single farmer, the spread of knowledge was, in fact, highly concentrated during a three-year period when 60 per cent of the farmers learned about it. Perhaps the important fact, for the present purpose. is that while over 90 per cent of the farmers had heard of the new seed by 1934, less than 20 per cent had tried it by then.

The data from the drug study point in the same direction, although they are less vivid. The time gap between hearing and adopting was necessarily much smaller among the doctors, since the drug was almost completely accepted in the communities studied less than two years after it was announced. The curve of adoption follows the curve of hearing much more closely among the doctors than among the farmers. Nevertheless, particularly during the early months following the release of gammanym, there is a substantial difference between the proportion of doctors who had heard of it and the proportion who had tried it: About two-thirds of the doctors date their earliest knowledge of the drug to within four months of its initial availability, but only about one-third of the doctors actually adopted it during this period. In later months, however, the cumulative curve of adoption and the cumulative curve of hearing move much closer together and roughly parallel each other. In the case of the farmers, it appears that almost everybody knew before almost anybody had adopted, so that information does not even begin to explain the difference between early and late adopters. In the case of later-adopting doctors, however, adoption came relatively soon after obtaining information. (21)

Nevertheless, there is a key piece of evidence which establishes that mere information did not constitute a sufficient basis upon which a doctor would decide to adopt, just as it was not sufficient for a farmer. The evidence is the fact that only about 10 per cent of the doctors reported that they had adopted gammanym after hearing about it from the source of information which brought them their first news of the new drug. In "reconstructing" the sequence of sources of information which had bearing on their decision to adopt, that is, doctors invariably named at least two, and usually three or four, such sources.

In other words, it seems reasonable to conclude that the availability of information that an innovation exists is not enough to make for its adoption. Additional factors must be sought, therefore, to explain both the decision to adopt as well as differentials in time of adoption.

4. The impact of various influences on the decision to adopt

Ryan and Gross report:

> Throughout Iowa, the spread of information about hybrid seed became a major educational campaign in the thirties

> for both public and private enterprises. . . . Behind the hybrid movement lay not only the rational appeals and authority of research and governmental agencies, but also the initiative and ingenuity of private business interests. (22)

Almost one-half of the farmers indicated that a salesman brought them their first information about the new hybrid corn, as Table 3 indicates. The second sources of influence in degree of importance were farmer-friends and neighbors.

Table 3

Original Sources of Knowledge of Hybrid Seed and Most Influential Sources

	Per cent of Farm Operators Crediting Source With	
	Original Knowledge	Most Influence
Salesmen	49%	32%
Neighbors and relatives	18	50
Farm journals	11	2
Radio advertising	10	--
Extension service	3	2
All other media	9	14
Total farmers (100%)	(257)	(257)

Adapted from Ryan and Gross, Acceptance and Diffusion of Hybrid Seed Corn in Two Iowa Communities, Table 5, p. 682.

The drug company salesman was no less important for the doctor than the seed company salesman was for the farmer. Altogether, 57 per cent of the doctors indicated that the "detail man" had brought them their first information about gammanym. The only other source of any importance as a source of first news was direct mail from the drug company which accounts for 18 per cent of the doctors. Much less frequently did doctors name another physician (7 per cent did so), or a professional journal (also 7 per cent) as a source of first information. (The picture is different for later sources of information, as will soon be seen.)

Both doctors and farmers typically went on to recount several other media as having been relevant -- according to their recollections -- for their decision to adopt the innovation. Although neighbors were mentioned by farmer-respondents relatively late in the sequence of relevant media, when asked to evaluate the various sources in terms of their relative influence, neighbors were cited as more influential than any other medium. (Table 3) Doctors, on the other hand, tended to evaluate salesmen as the single "most important" source followed by journal articles and colleagues. (Table 4) But it is also clear that the commercial sources (salesmen and direct mail) lose in relative importance when source of first knowledge and most influential sources are compared, whereas sources inside the profession -- journal articles and colleagues -- gain.

The results of the drug study are comparable to the Ryan and Gross findings in another sense, too. This can be seen by examining the sequence of channels named by the doctors as having had a bearing on their decision, as is done in Table 5 for physicians (and they were a majority) who named three sources or more.

Table 4

Original Sources of Knowledge of Gammanym and Most Influential Sources

	Per cent of Physicians Crediting Source With	
	Original Knowledge	Most Influence
Salesmen	57%	38%
Colleagues	7	20
Direct mail	18	8
Drug house periodicals	4	5
Journal articles	7	23
Meetings	3	--
All other media	4	6
Total physicians (100%)	(141)	(141)

From Table 5 it appears that, while colleagues may not be important sources of first information about gammanym, they become increasingly important as later sources which come to add information and to exert influence. Thus, the table indicates that colleagues were, by far, the single most important "last source" of information prior to adopting the drug. Notice, too, that journal articles and drug house periodicals increase in importance over time, while salesmen and direct mail fall off. The suggestion of the table seems to be that the earliest source of information, the salesmen or direct mail, serves an informational role primarily but is not regarded as a sufficient basis for action.

Table 5

Sequence of Sources of Information Mentioned by Physicians in Connection with the Decision to Adopt Gammanym*

	Per cent of Physicians Crediting Source With		
	Original Knowledge	Additional Information	Last Information prior to Adoption
Salesmen	52%	27%	5%
Colleagues and meetings	13	19	36
Direct mail	22	16	14
Journal articles	6	21	21
Drug house periodicals	3	11	21
Other media	4	7	3
Total mentions*	(87)	(131)	(87)

* The modal physician named three or more sources of information and this table includes only the 87 who mentioned three or more sources. These 87 doctors named 131 sources intermediate to their first and last sources, and thus the middle column is percentaged so that 100 per cent = 131 source mentions.

Before their decision to adopt is allowed to crystallize, physicians turn to less commercial and more professional sources such as colleagues, journal articles, and the quality publications of the drug companies. These appear to have a legitimating role; they indicate whether it is safe and right to go ahead. Ryan and Gross suggest exactly this:

> Insofar as the farmers' evaluations were accurate, it may be suggested that the diffusion agencies are divisible into two moderately distinct types: those important as introductory mechanisms, and those important as activating agents. Thus, salesmen were credited with informing the majority of the operators, but neighbors were credited with convincing them. . . . The spread of knowledge and the spread of conviction are, analytically at least, distinct processes, and in the diffusion of hybrid seed have appeared to operate through different although complementary channels. (23)

Recent work by other rural sociologists lends considerable support to this joint conclusion of the two studies. In general, it has been found that mass media serve to inform and that personal contacts are used to legitimate. (24)

These findings seem to indicate that it is incorrect to view the media as essentially competitive. In fact, it may be that the search for the "most influential" medium is a fruitless one. It would seem that the focus should be the different uses of the media in varying social and psychological circumstances. (25)

Thus, the direct testimony of respondents in the two studies contributes further to a picture of the workings of interpersonal influence in the diffusion process. It adds to the inferences which were drawn earlier, the notion that the diffusion process is rather more dependent on interpersonal communication as a source of legitimation than as a source of information. While the farmers' "reconstructions" of the channels of communication which figured in their decisions give major credit to interpersonal influence, the doctors mention this channel rather less prominently than the earlier data might have led one to expect. (The two sets of findings are not contradictory; but there is obvious need for research on the reconciliation of "objective" and "subjective" sources of data in diffusion research.)

5. Communication behavior of early and late adopters -- Connections with the world outside

The next question that needs to be asked is obvious: If informal interpersonal influence is so important, who influences the influentials? Assuming, for the moment, that it is the early adopters who influence later adopters, let us begin by determining who and what influences the early adopters. Since neither hybrid corn nor gammanym originated within the communities selected for study, an answer to this question will also help to locate the channels through which these innovations were "imported."

Turning again to the testimony of the respondents themselves, it is clear, from the hybrid-corn study, that the innovators differed from those who adopted later by virtue of their greater reliance on salesmen. Later adopters mention colleagues far more frequently and more prominently and, hence, the picture of a "two-step flow" of diffusion suggests itself. (26) Hybrid corn was brought to the community by salesmen who were disproportionately influential for the early adopters, and the early adopters then were the primary sources of influence for those who followed them.

Again, the case of the doctors is less clear-cut. First of all, the channels mentioned by early and late adopters in their "reconstructions" fail to discriminate between them. From their subjective accounts, it appears that everybody, early or late, is exposed to much the same sequence of sources of influence. But then what explains the promptness of the innovators? The most persuasive evidence available tends to show that connections with the outside world do, indeed, influence the early adopters. In this case, however, the evidence is not based on the doctors' subjective accounts, but rather on the correlation of some of their known habits of communication and their early or late adoption. The innovator is more likely to subscribe to larger numbers of medical journals, for example, and this is so whether he is a specialist or not. The innovator is more often to be found in attendance at out-of-town meetings of medical groups; the specialty meetings, in particular, distinguish between early and late adopters. Moreover, early adopters of gammanym: 1) visit out-of-town medical institutions and teaching hospitals more frequently than non-innovators, especially institutions at which they themselves received their training, and 2) look to a greater number of out-of-town medical institutions as sources of their medical knowledge. In short, they are more "in touch" and, hence, more up-to-date than later adopters.

Looking at the matter in this way, of course, cannot establish conclusively that more extensive contacts with the medical world outside the local community "caused" the early adoption of gammanym. It might be that keeping "in touch" is but another reflection of the same underlying pre-disposition to be up-to-date professionally as is early adoption of a highly recommended new drug. Ryan and Gross, as a matter of fact, prefer this interpretation for their very similar findings. (27) They found that the earliest hybrid adopters (23 farmers prior to 1934) reported an average of 4. 3 trips to Des Moines -- the nearest urban center -- in the year preceding the interview, whereas the latest group to adopt (17 farmers in 1940-41) visited Des Moines only 1. 5 times during the same period. Trips to county fairs, too, differentiated among the adoption groups. And, like the doctor-innovators, farmer-innovators were disproportionately likely to be avid readers of agricultural experiment station bulletins and high consumers of mass media generally. But from these data for doctors and farmers it does not seem a very daring inference that during the course of these efforts to keep "in touch" one learns of many new developments. One gets "the word" concerning them. Contact with the outside world, then, seems to be characteristic of innovators in the two studies.

6. The communications behavior of early and late adopters -- contacts with colleagues

If the two studies are alike with respect to the differential contact of early and late adopters with the world outside, they appear irreconcilable with respect to contact inside the community. The hybrid-corn study, as has already been indicated, finds that later adopters are more likely to indicate that neighbors had influenced them in their decisions to adopt. Furthermore, using the subjective testimony of the respondents concerning the extent of their "neighboring" as a measure of informal integration, Ryan and Gross find essentially no difference between early and late adopters in the extent of their informal community ties, although the early adopters are more likely to have been active in formal organizations of all kinds. Add to this the greater importance of outside connections for the innovator, and the resultant picture is one of a group of farmer-innovators who are oriented to connections outside their communities and who are proportionately more integrated in the formal organizational life than in the informal associational patterns.

At first glance, at least, this is not the case among doctors. The evidence of the drug study indicates that it was the early adopters who relied more heavily on their colleagues. In fact, the central finding of the study shows that integration in the medical community -- measured sociometrically-- is more closely related to time of adoption of gammanym than almost any other variable. And, unlike the relationship between outside connections and early adoption, in the present instance it can be shown that the fact of integration in the professional community "causes" early adoption via the intervening mechanism of interpersonal communication. Thus, it is evident from Figure 3 above that the integrated doctors were the earlier adopters and, from the shape of the curve, one can infer that this is because they channeled the message through networks of interpersonal communication. Moreover, doctors who adopted early were likely to adopt the new drug "simultaneously" with a sociometric colleague. That is, if doctors are paired according to their sociometric partnerships, and if the date of adoption of each set of partners is compared, it is found that innovating doctors were more likely than later adopters to write their first gammanym prescription close on the heels of a sociometric partner who had already written one. (28) Later adopters, on the other hand, do not act simultaneously with their sociometric partners any more than would be expected by chance. The "togetherness" of the early adopters, it is argued, necessarily implies interpersonal influence.

Thus the two studies are hardly parallel at this point. The hybrid-corn study finds that the channels mentioned by the farmers themselves distinguish early and late adopters; the drug study does not. The hybrid-corn study concludes that neighbors are more important for later adopters than for early ones; the drug study comes to the opposite conclusion. The drug study finds that doctor-innovators are more integrated inside the community (just as they are more connected outside), while the farm study finds informal integration unrelated to innovating behavior. On the other hand, both studies find more formal affiliations -- such as participation in hospital meetings, in the one study, and participation in organizations, in the other -- to be positively associated with early adoption.

One possible approach to the understanding of these conflicting sets of findings emphasizes the special importance of interpersonal communication for early-adopting doctors as compared with early-adopting farmers. Innovation in medicine is risky business. A new drug represents a highly ambiguous stimulus to which the doctor is asked to respond without knowing all that he would like to know about it. In this kind of situation, communication among colleagues serves to spread, and thus to reduce, the individual risk. Talking over what has been learned about the drug through "outside" channels; evaluating it; deciding to adopt "together" and pooling early experiences -- these are some of the functions of interpersonal communication among integrated, innovating doctors. The data almost imply a kind of "group decision." (29) This is not to argue that colleagues were ineffective for later adopters among the doctors. Indeed, they are probably quite important for these groups -- in much the way that Ryan and Gross found interpersonal communication important for later adopters among the farmers. The argument of the drug study, in fact, presumes that later adopters -- particularly among the integrated doctors but to some extent, too, among the isolates -- profited from the experiences of those who tried the drug earlier. The drug study, therefore, does not claim that interpersonal communication was unimportant for later adopters but only that it was unusually important for the innovators.

A second possible approach to an understanding of the two sets of findings focuses not on the different problems of innovating doctors, as compared with innovating farmers, but on the structure of values in the two communities. Ryan and Gross repeatedly emphasize that early adopters among the farmers were the vanguard of the secularization of rural life and:

> . . . that farmers most emancipated from the traditional closely built neighborhood life more easily emancipate themselves from a traditional technique. These innovators, with their far-reaching contacts, represent an antithesis to characteristic features of solidary primary-group living. (30)

This is not true for the doctors. Integration in the larger medical world and allegiance to the scientific values of that world are strongly consonant with informal integration in the local community of colleagues. Indeed, these two kinds of affiliations, although perhaps not wholly without conflict, are empirically correlated and tend to reinforce each other. The local-colleague group, that is, seems to be identified with the scientific ethic of the profession as a whole. Therefore, it is the doctors who are most integrated, both formally and informally, both inside the local community and outside, who are in the vanguard of medical innovation. There is no question for the doctor, as there is for the farmer, of emancipation from local primary groups as a prerequisite to the acceptance of innovation. (31) In a sense, there is a parallel in this approach to the finding, in another study, that informal leaders in farm communities which are positively oriented toward innovation were ahead of the average community member in the number of recommended farm practices adopted, while the informal leaders of conservative-traditional communities were as far behind as the average member. (32) Where the norms of informal groups do not favor innovation, that is, innovators will not be found to be well-integrated members of such groups.

7. Other attributes and attitudes which distinguish early and late adopters

A number of other factors distinguish early and late adopters and, although they do not bear directly on the role of interpersonal relations in the diffusion process, they are important for the comparative task undertaken here. One of the most interesting of these is the attitude of "secularism" which is invoked repeatedly in the hybrid-corn study as a motivating factor in the behavior of innovators. It represents an openness to rationality rather than tradition as a criterion for decision-making. The parallel among the doctors is the doctor with "scientific orientation," an attitude which also implies an openness to change. Thus, construction of an index of "scientific orientation" (based on doctors' concern with research, exchange of scientific information and scientific reliability of information) reveals that the more scientifically oriented doctors adopted gammanym earlier -- this, despite the greater caution which one also associates with scientific orientation. Similarly, the innovating doctor is more "profession oriented" than "patient oriented." As compared with later adopters, he measures himself in the eyes of his colleagues rather than in those of his patients.

What personal attributes characterize the innovators? The early adopter of gammanym, first of all, was a heavy user of drugs in the gammanym family prior to the appearance of gammanym; the farmer-innovator, by the same token, had considerably more corn acreage than later adopters. Both farmers and doctors who adopted early tended to be of higher socioeconomic status than their fellows: the farmer-innovators had more education and higher incomes (although they were not significantly more likely to be owners of their own farms as compared with later adopters), while doctor-innovators were more likely to have patients of higher incomes (and thus, presumably, to have higher incomes themselves). Nevertheless, as has already been pointed out, there is no a priori reason why economic status should have been associated with early acceptance of these innovations although new drugs, of course, are notoriously expensive and doctors with poorer patients cannot so readily confront their patients with drugs of this kind.

Farmer-innovators were young; doctor-innovators, while very unlikely to come from the oldest age group, were slightly more likely to be in the middle-age bracket than in the very youngest group.

A Summary of Similarities and Differences

Altogether, considering that farmers and corn seed were compared with physicians and drugs, the similarities in the findings of the two studies give strong support to a number of empirical generalizations.

The comparability of the two studies is made possible in the first place because both studies were designed to take account of the major components of the process of diffusion viewed sociologically. Thus, 1) both studies focus on a given innovation. 2) Both follow the spread of the innovation through time, by devising methods for assigning a date to each adopter's first use of the innovation. 3) Both studies are concerned with the channels of communication which carried news of the innovation as well as with the channels which carried word that it was all right to go ahead and try. And, finally, 4) both studies specify social structures within whose boundaries the innovation spreads and with respect to which individual adopters are differently "located".

Given this kind of research design, certain kinds of analysis follow directly. Thus, both studies plot curves of diffusion to map the spread of the innovation, over time, within the social structure or various parts of it. The authors of the corn study inferred from the curve that interpersonal influence would appear to account for the observed pattern of spread. The drug study went one step further and, by comparing the curves for "integrated" and "isolated" doctors, could show that interpersonal influence was operative precisely where it would most likely be expected -- among the "integrated" doctors. Thus, the drug study was able to confirm and further to specify the conditions for the operation of interpersonal influence in the process of diffusion.

Similarly, employing the data on channels of communication, both studies find that "information is not enough" -- neither farmers nor doctors accepted the innovation upon first hearing. It was shown that there are media which typically inform a potential adopter about an innovation, and that there are media which "activate" or "legitimate" the decision to adopt. The former tend to be more commercial and more formal; the latter more professional and more informal. The salesman is a key source of information in both studies; interpersonal influence among colleagues is a key source of legitimation. By cross-tabulating time-of-adoption and channels of communication, both studies find the innovators more closely connected to sources of information and influence outside the community. Innovating doctors make more trips to out-of-town meetings than do later adopters; innovating farmers make more trips to the city.

By cross-tabulating time-of-adoption and relative integration, the drug study finds that early adopters have relatively more contacts inside, as well as outside, their home communities; they are more integrated in informal social relations with colleagues. The corn study, however, finds the early adopters more "independent" of informal community ties. Two approaches to the reconciliation of the conflicting findings were proposed.

Whether these generalizations apply equally to the diffusion of other innovations remains to be seen, of course. Surely, the special characteristics of these innovations, the particular way in which they were marketed, the peculiar characteristics of the social structures into which they gained entry, must all have affected their social itineraries. Clearly, what is needed is a comparative study of innovation which will trace different innovations, variously classified, as they proceed through given social structures. Altogether, the aim of this article has been to contribute to the design of such research and to help sharpen the issues which must be confronted.

Table 6

A. The Design of the Two Studies

	Corn Study	Drug Study
A specific innovation	Hybrid corn	"Gammanym" (a "miracle" drug)
Time	Farmers classified according to own reports on year of first use	Doctors classified according to date of first prescription on file in pharmacies
Channels	Farmers' reports on the channels that influenced their decisions to adopt; farmers' reports on their general communications behavior	Doctors' reports on the channels that influenced their decisions to adopt; doctors' reports on their general communications behavior.
Social structure	All farmers in two Midwestern farming communities; individuals classified in terms of age, size of farm, etc., and in terms of their own reports concerning formal and informal integration	All doctors in four Midwestern communities; individuals classified in terms of age, type of practice, etc., and in terms of relative formal and informal integration measured sociometrically

Table 6 (continued)

B. The Findings of the Two Studies

	Corn Study	Drug Study
Rate of diffusion	Curve implies three stages in diffusion process; and operation of interpersonal influence	(Curve implies two stages?); curve for "integrated" doctors implies interpersonal influence; curve for "isolated" doctors implies individualistic adoption
Extent of first use	Early adopters are conservative in extent of first use; later adopters, building on experience of their predecessors, give more acreage to hybrid in season of first use	Early adopters are conservative in extent of first use; later adopters, building on experience of their predecessors, write a larger number of gammanym prescriptions in month of first use
Channels of information and influence	Lack of information does not explain differentials in time of adoption implying that information alone is not enough to make for adoption	Only 10% of doctors adopt on basis of information brought by initial information source implying that information alone is not enough to make for adoption
	Typical farmer heard first from a salesman, then talked it over with a neighbor. Neighbors were judged "most important" information source. Implication that commercial and formal sources "inform" while more informal sources "legitimate" decision to adopt	Typical doctor heard first from a salesman, then read about it in a journal and/or discussed it with a colleague. Salesmen were judged "most important" information source. Implication that commercial and formal sources "inform" while more informal sources "legitimate" decision to adopt

Table 6 (continued)

	Corn Study	Drug Study
Communications behavior of early and late adopters	Early adopters read more farm bulletins	Early adopters read more medical journals
	Early adopters name salesmen as information sources more frequently than later adopters; latter name neighbors more frequently	No difference in recall of information sources by early and late adopters
	Early adopters make more trips to city, county fairs	Early adopters attend more out-of-town meetings
	Early adopters belong to more formal organizations; no difference in extent of informal neighboring	Early adopters more integrated than later adopters in informal friendship discussion and advice networks
Other differences between early and late adopters	Early adopters more "secular" in attitudes; later adopters more "traditional"	Early adopters more "scientific" in attitudes; also more "profession-oriented" (rather than "patient-oriented")
	Early adopters have more corn acreage	Early adopters are heavier users of "miracle" drugs
	Early adopters have more income, more education	Early adopters have richer patients
	Early adopters are younger	Early adopters unlikely to come from oldest age group

REFERENCES

1. Elihu Katz is in the Department of Sociology at the University of Chicago and is a partner to James Coleman and Herbert Menzel in one of the two studies which are introduced for comparison here. The issues which have arisen out of this joint preoccupation constitute much of the framework for what follows. In addition, the article has benefited from the critical reading and suggestions of these associates as well as those of Bryce Ryan and Neal Gross, the authors of the second study. The advice of C. Arnold Anderson, Benjamin D. Paul, Everett M. Rogers, and Samuel Stouffer is also gratefully acknowledged. The Social Science Research Committee of the University of Chicago and the Foundation for Research on Human Behavior have contributed to the support of an inventory of research on the diffusion of innovation of which this article is a by-product.

2. Discussion of this study will be based on the journal article reporting some of the central findings and, particularly, on the later, more comprehensive report. These are, respectively, Bryce Ryan and Neal Gross, "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology, VIII (March, 1943), 15-24, and Ryan and Gross, Acceptance and Diffusion of Hybrid Seed Corn in Two Iowa Communities, Iowa State College of Agriculture and Mechanic Arts, Bulletin 372, 1950.

3. A book by James Coleman, Elihu Katz, and Herbert Menzel, tentatively titled Doctors and New Drugs, The Free Press, Glencoe, Illinois, is in preparation. Published reports on the study include: Menzel and Katz, "Social Relations and Innovation in the Medical Profession: The Epidemiology of a New Drug," Public Opinion Quarterly, XIX (Winter, 1955-56), 337-52, a report on the pilot study; Menzel, "Innovation, Integration and Marginality: Facts and Problems from a Survey of Physicians," American Sociological Review, forthcoming; Menzel, Coleman, and Katz, "Dimensions of Being 'Modern' in Medical Practice," Journal of Chronic Diseases, IX (January, 1959), 20-40; Coleman, Katz, and Menzel, "The Diffusion of an Innovation Among Physicians," Sociometry, XX (December, 1957), 253-70; and Coleman, Menzel, and Katz, "Social Processes in Physicians' Adoption of a New Drug," Journal of Chronic Diseases, IX (January, 1959), 1-19. An important part of the substantive material is contained in the latter two articles while other parts are available only in unpublished research reports of the Bureau of Applied Social Research, Columbia University.

4. For a discussion of the sequence of studies which contributed to the formulation of the drug study, see Elihu Katz, "The Two-Step Flow of Communications: An Up-to-Date report on an Hypothesis," Public Opinion Quarterly, XXI (Spring, 1957), 61-78.

5. This point is developed in Elihu Katz and Paul F. Lazarsfeld, Personal Influence: The Part Played by People in the Flow of Mass Communication, The Free Press, Glencoe, Illinois, 1956, pp. 15-25.

6. Reviews of some of these studies may be found in Katz, "The Two-Step Flow . . . ," op. cit. and in John W. and Matilda W. Riley, "Mass Communications and the Social System," in Robert K. Merton et al. (eds.), Sociology Today, Basic Books, New York, 1959.

7. See Elihu Katz, "Communication Research and the Image of Society: The Convergence of Two Traditions," American Journal of Sociology, LXV (March, 1960), 435-40.

8. The name gammanym is a pseudonym.

9. Edward M. Wellin, "Water Boiling in a Peruvian Town," in Benjamin Paul (ed.), Health, Culture, and Community, Russell Sage Foundation, New York, 1955.

10. "While it would be difficult to place a date at which the perfectly rational man would have adopted hybrid seed, under the assumptions of classical economic theory, the adoption date would have been practically the same for all operators. That is, variations in the rational desirability of the seed between farmers were at a minimum -- the trait was economically advantageous to all, and to much the same degree." Ryan and Gross, op. cit., 670. On the other hand, an economic analysis of time differentials in the diffusion of hybrid corn between different areas of the country (rather than within an area) shows that the "profitability" of the shift from open-pollinated to hybrid is highly associated with the rate of acceptance. See Zvi Griliches, "Hybrid Corn: An Exploration in the Economics of Technological Change," Econometrica, XXV (October, 1957), 501-22.

11. Suggestive attempts to classify innovations in this way have been made by a number of authors. See, for example, Homer T. Barnett, Innovation, McGraw-Hill, New York, 1953; E. A. Wilkening, Acceptance of Improved Farming Practices in Three Coastal Plains Communities, North Carolina Extension Service Technical Bulletin No. 98, Raleigh, North Carolina, 1952; E. E. Emery and O. A. Oeser, Information, Decision and Action, University of Melbourne Press, Melbourne, Australia, 1958; and Herbert Menzel, "Innovation, Integration and Marginality," op. cit.

12. The drug study also asked doctors, during the course of the interview, to recall the date of their first use of gammanym, and the discrepancies between the objective and subjective information were analyzed. The data reveal that doctors erred in both directions, but the marked tendency of most doctors

was to report themselves as having adopted the new drug considerably earlier than they actually did. Nevertheless, despite the tendency to "update" themselves, there is a positive correlation between the adoption dates obtained from the doctors and from the prescription record. See Menzel, Coleman, and Katz, "Dimensions of Being 'Modern' . . ." op. cit. Although it is probable that farmers also have faulty memories, given that corn is their most important crop and that they were asked to name the year of first use, it may be that their errors are smaller than those of the doctors. On the other hand, the farmers were interviewed long after most of them had begun using hybrid corn, thus increasing the chance of error.

13. Ryan and Gross employ this kind of correlational analysis, too. For example, they inquire concerning reading habits in much the way the drug study does and they find, as the drug study does, that early and late adopters are noticeably different in their communications behavior. Their tendency, however, is to interpret such results as if they were part of the set of factors predisposing respondents to early or late adoption, rather than direct influences on the specific decision being studied. The drug study does this and more; it tries in certain instances, to establish a causal link between exposure to certain media and the specific decision to adopt -- even though the respondent does not mention this medium in the "reconstruction" of his decision.

14. For good examples, see Stuart C. Dodd, "Formulas for Spreading Opinions," Public Opinion Quarterly, XXII (Winter, 1958-59), 537-54, and more impressionistically, William H. Whyte, Jr., "The Web of Word of Mouth," Fortune (November, 1954). The Swedish geographer Torsten Hagerstrand has mapped the spread of an innovation from urban centers to outlying districts, etc., emphasizing the role of social contacts within given localities. See, "The Propagation of Innovation Waves," Land Studies in Geography, No. 4, The Royal University of Lund, Lund, Sweden, 1952.

15. See Public Administration Clearing House, "Experiences of Personnel of U. S. Voluntary Agencies," Economic Development and Cultural Change, II (June, 1954), 29-349. This presumes that group norms bind the more integrated members of a group more than the more marginal members and, hence, that group leaders are the most conformist members of their groups. For evidence concerning the relevance of this hypothesis for response to innovation, see C. Paul Marsh and A. Lee Coleman, "Group Influences and Agricultural Innovations: Some Tentative Findings and Hypotheses," American Journal of Sociology, LXI (May, 1956), 588-94.

16. Several studies have proceeded from a sociogram of friendship to map the flow of rumor. See Jacob L. Moreno, Who Shall Survive, Beacon House, Beacon, New York, 1953, pp. 440-50; Leon Festinger et al., Social Pressures in Informal Groups, Harper, New York, 1950, Chap. 7; Back et al., "A Method for Studying Rumor Transmission," in Leon Festinger et. al.,

(eds.), Theory and Experiment in Social Communication, Research Center for Group Dynamics, University of Michigan, Ann Arbor, Mich., 1950. In the field of rural sociology, the most intensive analysis of the process of information diffusion within and between informal social structures has been the work of H. F. Lionberger. See, especially, Lionberger and Coughenor, Social Structure and Diffusion of Farm Information, Agricultural Experiment Station, College of Agriculture, Research Bulletin 631, University of Missouri, Columbia, Missouri, 1957, and the articles on this study in Rural Sociology, XIX (September and December, 1954), 233-344, 377-84.

17. Ryan and Gross, "Adoption and Diffusion. . .," op. cit., 707, footnote 62.

18. These matters are more fully, and somewhat more technically, discussed in Coleman, Katz, and Menzel, "The Diffusion of an Innovation. . .," op. cit., 256-62. This article also presents theoretical curves alluded to here. Note that only the factors associated with relative integration behave in this way. The curves which distinguish doctors who read many journals also distinguish between early and late adopters, but the slopes of the two curves are quite parallel. See the discussion in Coleman, Menzel, and Katz, "Social Pressures in Physicians' Adoption. . .," op. cit., 13.

19. These figures have been corrected for seasonal variations in the general level of use of drugs of the gammanym type. The method employed to make these corrections will be discussed in the Appendix to the forthcoming volume by Coleman, Katz, and Menzel.

20. Ryan and Gross, op. cit., 681.

21. This is somewhat surprising in view of the fact that the drug company salesmen blanket a medical community quite early, and quite thoroughly, upon the appearance of a new drug. For this and other reasons, it seems likely that physicians knew about the drug earlier than they actually reported having heard about it. If this is true, it suggests that, whereas there is a tendency on the part of physicians to report an earlier date for actual use of the drug, there may be a tendency to report a later date for hearing about it so that the gap between hearing and action is shortened. This has not yet been looked into carefully and, of course, is difficult to check. For the moment, the data appear to imply that later adopters also heard about the drug later.

22. Op. cit., 682.

23. Op. cit., 685.

24. A good example is E. A. Wilkening, "Roles of Communicating Agents in Technological Change in Agriculture," Social Forces, XXXIV (May, 1956), 361-67.

25. In this connection, see the new approach of George M. Beal and Joe Bohlen, The Diffusion Process, Iowa Agricultural Experiment Station, Special Reprint No. 18, Ames, Iowa, 1957; and James H. Copp, Maurice L. Sill, and Emory J. Brown, "The Function of Information Sources in the Farm Practice Adoption Process," Rural Sociology, XXIII (June, 1958), 146-57.

26. The history of this concept is discussed in Katz, "The Two-Step Flow . . . ," op. cit. and its relevance for innovation in agriculture is discussed explicitly in Everett M. Rogers and George M. Beal, "The Importance of Personal Influence in the Adoption of Technical Changes," Social Forces, XXXVI (May, 1958), 329-40.

27. Ryan and Gross, "Acceptance and Diffusion . . . ," op. cit. 706-07.

28. This matter is rather fully discussed in Coleman, Katz, and Menzel, "The Diffusion of an Innovation . . . ," op. cit., 262-68.

29. The role of interpersonal influence in ambiguous situations has been studied experimentally, notably by Muzafer Sherif, "Group Influences Upon the Formation of Norms and Attitudes," in Maccoby, Newcomb, and Hartley (eds.) Readings in Social Psychology, Henry Holt, New York, 1958, pp. 219-33. The relevance of this formulation to other aspects of physicians' reactions to new drugs is discussed in Menzel and Katz, op. cit., 344 and in Coleman, Katz, and Menzel, "Social Processes in Physicians' Adoptions . . . ," op. cit., 17-18.

30. Ryan and Gross, "Acceptance and Diffusion. . . ," op. cit., 707.

31. Of course, there may well be types of innovation in medicine toward which the otherwise progressive norms of professional medical groups would be inhospitable. The history of medicine provides many examples such as those reported by Bernhard J. Stern in "Social Factors in Medical Progress," Faculty of Political Science of Columbia University (eds.), Studies in History, Economics and Public Law, No. 287, Columbia University Press, New York, 1927. See also Menzel, Coleman, and Katz, "Innovation, Integration and Marginality," op. cit., for a discussion of different types of innovation in medicine.

32. Marsh and Coleman, op. cit.

THE COMMUNICATION OF IDEAS ON INNOVATION IN AGRICULTURE

E. A. WILKENING

Dr. Wilkening, professor of Agricultural Economics at the University of Wisconsin, here writes from a long career of studying agricultural innovation.

THE COMMUNICATION OF IDEAS ON INNOVATION IN AGRICULTURE

by

E. A. Wilkening

It has been easier to accumulate a body of scientific knowledge and techniques for the intended benefit of farmers than to obtain their acceptance. Hence, the diffusion of new ideas and techniques in agriculture has long been a concern of both public and private agencies. New ideas and techniques are developed through the application of biological, chemical, and mechanical principles to agricultural problems with the intent of more efficient use of resources. But, the adoption of these ideas and techniques by the farmer is governed by more than considerations of efficiency. It is likely to involve a change in long-established ideas, attitudes, and ways of doing things; it may involve a change in relationships with family members, friends, and other persons; it may involve adjustments in other activities and operations of the farmer. Thus, the acceptance of innovation in agriculture requires more than the communication of the technical aspects of the innovation; it involves the communication of ideas, feelings, and aspirations as well as information about costs, techniques, and returns.

The farmer who has developed a favorable attitude toward a scientific approach to farming through association with educational and service agencies is likely to have little difficulty in assessing the merits of new ideas and practices and adopting them if appropriate for his situation. On the other hand, for the farmer who is relatively isolated from the institutionalized agencies of information and service, information on new ideas must go through a process of translation, interpretation, and assimilation through appropriate social channels. The acceptance of an innovation is a mental and social process in which the scientific facts, local experience and attitudes, personal feelings and aspirations, and the objective farm situation interact with each other over a period of time until the innovation is accepted and assimilated or until it is no longer of concern to the farmer.

It should be stated here that acceptance of new practices is not necessarily the test of effective communication. The criteria of effective communication is the understanding of the new practice and its consequences in order that intelligent decisions can be made with respect to its adoption or rejection. The criteria of effectiveness can also be applied to the group, i.e., whether a particular group has acquired the knowledge and understanding of the new practice in order that its members can come to decisions most appropriate for the attainment of both individual and group objectives.

While the communication of agricultural information is not essentially different from the problem of communication in other areas, the multiplicity of farming units, the close integration of family and farm in most agricultural areas, and the widely varying economic, social, and cultural conditions make the problem of the communication of information to farm people particularly challenging to the practitioner and of great interest to the student of technological change. Within the past two decades more than a hundred studies have been made by rural sociologists, agricultural economists, and other social scientists of the adoption of new farm practices and the communication of information to farmers. (23) Anthropologists have also been concerned with the problem of technological change as influenced by cultural factors. (2, 21, 29) However, this chapter will be based primarily upon studies of farmers in the United States, leaving to others more familiar with the materials the task of doing a similar thing for other cultural regions. * First, an attempt will be made to define the nature of the problem of the communication of information about innovations in agriculture as a sociologist sees it. The remainder of the chapter will deal with the role of four major types of communicating agencies or channels in the process of the diffusion of new ideas and techniques in agriculture. **

The four types of communicating agents to be considered are defined as follows:

1. Educational and service agencies: the colleges of agriculture, including the extension services, state departments of agriculture, vocational agriculture classes, adult classes, Soil Conservation Service, and other state and federal agencies.

2. The mass media: farm magazines, farm papers, newspapers, widely distributed circulars or pamphlets, radio, and television.

3. Buying and selling firms (private and cooperative): farm machinery, equipment and supply dealers, purchasing or marketing firms, and road salesmen.

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* In addition, the author has drawn from studies in Australia (12) and studies being conducted in the Netherlands by A. W. von den Ban of Wagenegin University.

**The term "communicating agencies" is used as a term to denote the system which originates, transmits, or in other ways affects the messages which farm people receive. It is used in preference to, although synonomously with "channels" or "sources" of information. From the sociologist's point of view the agents of communication are social systems which ordinarily perform other functions than the communication of information on agricultural matters, and they are made up not of a single type of transmitting agent but of several, the functions of which vary.

4. Other farmers: neighbors, friends, and other farmer contacts.

This classification is not exhaustive of the types of communicating agencies nor does it represent exclusive categories. For example, most of the educational and service agencies use one or more forms of the mass media, particularly pamphlets and news stories. Buying and selling firms also employ the mass media, although the two are usually separate organizations with somewhat different functions. Other farmers may be a part of the communication pattern of agencies of commercial firms and of the mass media. The classification is based primarily upon the function of the agency in its contact with the farmer and not upon the original source of the information nor upon the connections between the various contacts before they reach the farmer. Yet, the researcher as well as the practitioner, should be aware of the interconnections among the various agents of communication if their total impact is to be understood and their resources utilized.

The major types of communications are discussed with respect to: (a) their general characteristics and functions which affect their role in communicating agricultural information, (b) their role in the process of acceptance of new ideas and practices on the part of the individual, and (c) their role in the process of diffusion of new ideas within the group, which includes a consideration of the clientele of or participation in the agency.

Definition of the Problem of Communicating Information about Innovations in Agriculture

This chapter will deal primarily with the communication of information about new ideas and techniques in farming and not about all types of agricultural information. While no attempt is made here to define just what an innovation is and to classify the different types of innovations, one should be aware of the wide range in types of innovations in agriculture. (2) It includes innovations in the management and business aspects of the farm enterprise as well as in the technical aspects, although much more attention has been given in the literature to the communication of new techniques. Innovations may be classified according to whether they involve changes in materials or equipment, changes in skills, changes in operational sequences and spatial arrangements, or changes in the type of product. Innovations in agriculture can also be classified according to the extent to which they involve changes in output as related to changes in capital, labor, land, or managerial ability. The first classification is based upon the social as well as technical implications of the change, while the latter is based upon the economic implications of the change. In either case, the rate of acceptance of the innovation, the channels through which information is obtained and the type of communications involved are associated with the type of innovation. (32, 35)

Communication occurs within a social and cultural context. With respect to agriculture this context includes the farm, the family, and the community, as well as the larger society which provides incentives, resources and stimuli of various kinds. In defining the nature of the problem of communicating agricultural information, it is necessary to know something of how these sociocultural variables affect communication. For example, it is important to know to what extent family members discuss farm matters, where and how frequently farmers get together to discuss farm matters, the extent and nature of social stratification, the institutional systems which influence peoples' attitudes and actions, and the dominant values, norms, and aspirations of the people. *

Much of the resistance to innovations in agriculture appears to stem from a resistance to change itself rather than to resistance to specific innovations. Change is resisted by persons as well as by groups to the extent that the readjustments resulting from the change are not offset by greater perceived advantages. This resistance may take the form of pride in traditional ways of doing things and a reluctance to admit that there are "better ways." This conservatism may be viewed as an overemphasis upon the integration of the system or an attempt to maintain its own "integrity" rather than upon instrumental-adaptive behavior which involves adjustment to and dependence upon the outside world. The group which strives to maintain its traditional ways of doing things at all costs has not developed the ideas, attitudes, and norms, nor the social roles which support innovative behavior. This is likely to occur among communities which are relatively isolated from contact with the outside world because of physical barriers, language barriers, or other conditions affecting such contact.

A strong primary group orientation based upon family, religion, and nationality makes for a kind of closed social system, hence retarding communication from the outside. The institutions of family and church are concerned with the integration of their members through symbols and meanings drawn from the past and to a lesser extent with adaptation to new conditions and forces. Studies in North Carolina and in Wisconsin have shown that strong emphasis upon family and religious values is associated with a resistance to new ideas in education and agriculture. (24, 34) These studies suggest that the stronger the ties of family, church, and nationality, the more resistance there is to communications from persons and agencies outside the group. In the strongly knit group based upon kinship, as among the Spanish Americans of southwestern United States, the Polish in Wisconsin, and others, communications must enter through the recognized leaders of the kinship group or church before effective contact is established.

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* See S. N. Eisenstadt, "Conditions of Communication Receptivity." (Public Opinion Quarterly, Vol. 17 [No. 3], pp. 363-74) for a discussion of some of the sociological conditions affecting communication. It is worth noting that few studies by rural sociologists have approached the problem of technological change in agriculture from the standpoint of the structural and cultural content of the society. For exceptions see studies by Lionberger and Coughenour, (16) Wilkening, (34) and Marsh and Coleman. (19)

On the other hand, the development of the social clique is the kind of primary type of association which coincides more with technological advancement and a higher degree of social differentiation along class lines. (17) The clique forms on the basis of common interests and achieved status, hence is more conducive to the dissemination of information about new ideas than those primary groups based upon ascribed statuses such as family, church, and residence. This suggests the wide range in receptivity to new ideas and communications among communities. The modern farm community is more likely to have many channels of contact outside the locality. In a Wisconsin community it was found that almost one-third of the social contacts of a sample of farm owners were outside a three-mile radius. And those whose contacts ranged the furthest had adopted more improved farm practices than those whose contacts were more limited. * Ryan and Gross (26) and Lionberger (15) found similar results in studies in Iowa and Missouri. Degree of urbanization, indicating contact beyond the local community, has also been found to be positively associated with the acceptance of new farming techniques in Australia by Emery, Oeser, and Tully. (12)

Hence, the communication pattern among rural communities ranges from the closely knit isolated community in which interaction patterns tend to be restricted, to the commercialized farm community in which many communication channels are open to the farmer and among which he is relatively free to choose. The availability and functioning of the institutionalized agents of communication have an important bearing upon the nature and effectiveness of the communication of agricultural information. The factors associated with the use of institutionalized sources of information have been considered in several studies (16, 32), the results of which will be brought out in subsequent sections of this chapter.

The discussion up to this point has dealt with the nature of the sociocultural setting within which the communication of agrucultural information takes place. Before discussing the role of the major communicating agents in the diffusion of new ideas and practices, first, a brief account of the nature of the process of the acceptance of a new idea.

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* Unpublished data from study of factors affecting adoption of improved farm practices in Rock County, Wisconsin, by E. A. Wilkening, Department of Rural Sociology, Agricultural Experiment Station, 1952.

Communication and the Stages of Adoption

The acceptance of a new technique or change in the farming enterprise is a process which occurs over a period of time for each individual and for each group of interacting persons.* During the process of acceptance the individual becomes aware of the innovation, learns about its characteristics, costs and consequences, compares these with those of existing practices in the solution of problems or attainment of goals, makes decisions to initiate the innovation or to disregard it, and, finally, if the decision is favorable, adopts the innovation. Initial adoption of an innovation, however, does not mean acceptance. Usually farmers as well as others make the initial adoption on a trial basis and continue its use only if satisfied with the trial. Complete acceptance is dependent upon an understanding of the various manifestations of the innovation and making the necessary adjustments to take fullest advantage of it.

As an illustration of the time dimension of the process of acceptance of innovations in agriculture, approximately 5.7 years elapsed from the time farmers of an Iowa community first heard about hybrid corn until they tried it. (27) Variations in the speed of this process for different types of practices is illustrated by the fact that it took a group of North Carolina farmers eight years on the average to adopt improved permanent pastures after hearing about them, and a group of Iowa farmers 1.5 years to adopt a new antibiotic feed additive after first hearing about it. (32)

Empirical studies show that farmers go through several stages in the adoption of new practices. While the number of stages and their identification varies with the researcher, there is common agreement that four to five stages can be identified. (4) These are as follows:

Awareness. The stage at which the individual is exposed to the new idea and becomes aware of it.

Interest or information. The stage during which the individual becomes sufficiently interested in the new idea to learn about its characteristics and consequences as compared with existing practices.

Decision making or application. The stage at which the individual considers the new idea for his own situation, decides whether the advantages are sufficient to offset the risk, costs, and adjustments required by the new practice, and whether to try it or not.

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* This may be a community, social strata within the community, or other segment of interacting persons.

Trial. The stage at which the individual takes the action necessary to give the new idea a try. This stage requires specific knowledge of how and when as well as the resources for putting the new idea into operation.

Acceptance or adoption. The stage at which the new idea has been accepted for continued use following satisfaction with the initial trial.

Those individuals who complete the process of acceptance first are the initiators or innovators of the process of acceptance of the new idea or practice by the group of which they are a part. Studies have shown that the adoption of a new practice proceeds slowly at first, increases at an ascending rate until almost all of the potential adopters have adopted it, and then levels off.* This is the process of group acceptance of a new idea. The process is a function of the interaction of the members of the group. Hence, the rate of acceptance by the group is a function of the nature and rate of interaction, or communication among the members. (8) For example, it required 10 years from the initial adoption of hybrid corn in an Iowa community until two-thirds had adopted hybrid corn. (27) Physical, social, and cultural barriers which affect contact and communication among the members of the group will affect the rate of acceptance of the innovation.

The problem of the practitioner is that of how to speed up the process of acceptance of new ideas and practices by the individual and by the group. Perhaps more attention has been given to the psychology of individual acceptance of new ideas than to the sociology of group acceptance. These represent two approaches to the same problem, both of which need to be taken into account. The problem is one of determining what influences operate at various stages in the process of acceptance, by what individuals, i. e. innovators, leaders, or followers,** educated or uneducated, members or nonmembers of organizations, etc. Due to the different interests, abilities, and roles which people play, they are influenced by different stimuli in the acceptance of innovations. Some are receptive to and influenced by information and forces from outside the group while others take their cues from other members (innovators or early leaders) from within the group. Hence, it is important to know who is influenced by what outside source, and, secondly, how these persons influence others within the group.

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* When the number of persons adopting a new practice is plotted by year, the result approximates a normal curve, assuming no unusual circumstances. (25)

** The persons adopting innovations at different times have been variously classified. One report uses the following classification: innovators, community adoption leaders, local adoption leaders, majority, and non-adopters. (23) Beal and Rogers have developed a classification based upon deviation from the mean using the terms innovators, early adopters, early majority, late majority, and laggards. (4)

Recent studies show that the communication of new ideas within a group such as a farm community occurs as a continuous process, from those most receptive to personal and impersonal sources from the outside to those influenced by close personal associates, usually neighbors or relatives. This is a modification of the notion of the two-step flow of information from the mass media or other impersonal sources to influentials or leaders, thence to the majority. (14)

Now we come to the more specific questions about the communication of agricultural information. What is the role of the various communicating agents in the diffusion of new ideas and techniques in agriculture? Then, what is the differential access to and use of the communicating agents by persons with different statuses and roles? The first question pertains to the implications of the characteristics of the communicating agents for the type of information transmitted in the process of the acceptance of new ideas or innovations. The second pertains to the implication of the characteristics of the communicating agents for the clientele served. These represent two aspects of the role of communicating agents in the process of the diffusion of new ideas and techniques in agriculture.

Educational and Service Agencies

The promotion of new ideas and practices in agriculture is the primary concern of publicly supported institutions such as the Land Grant colleges and universities and the U. S. Department of Agriculture and the secondary concern of vocational agruculture classes in high schools and of others such as the state departments of agriculture and other public agencies providing technical aid, subsidies, or loan funds. The extent to which these agencies are concerned with the promotion of new ideas as opposed to the teaching of general knowledge and skills, providing capital and performing regulatory and service functions, of course varies with the agency and with the personnel in the agency. Only cursory attention can be given to the way in which the differences in objectives and structure of the agencies affect their role in the diffusion of new ideas and training practices.

The nature of agricultural agencies places limitations upon their role in the diffusion of information about new ideas and practices. Of course these limitations are often overcome through self-conscious effort on the part of the agencies themselves. Agencies are usually limited in personnel and resources, hence cannot be expected to reach and influence as many people as other channels which may not have such limitations. Of greater significance is the fact that public agencies are separate social systems whose goals, norms, and motivations coincide only in part with those of the people in particular groups or communities. As state and federal agencies concerned with problems of state and nationwide scope, their objectives cannot coincide entirely with local interests.

Agencies tend to limit themselves to the promotion of those practices which have rather wide applicability, although through personal advisory work are able to extend their influence to changes appropriate to the individual farmer. Furthermore, the means employed for carrying out the objectives will not always receive local sanction. The procedures of agencies tend to be rationalized and based upon universalistic criteria, which may be contrary to the local norms which define the direction of influence and the basis for making changes.

The formalized nature of the agencies also imposes limitations upon the extent of their influence although through informal means they can extend their influence beyond those who participate in formal groups. The effective agricultural leader is one who maintains informal contacts with influential persons without jeopardizing the relationship of these influentials with those influenced by giving them too much formal recognition. Such an approach in extension work with influential persons who are not formal leaders is frequently referred to as the indirect method. The agency instructs farmers who in turn influence others with whom they have personal contacts.

Most studies have shown that the innovators have close contact with one or more of the educational agencies. (7, 9, 16, 32) Some may not depend upon the local county agent or other local agricultural representative but have contact directly with scientists or specialists at the state level. Furthermore, they are likely to read the bulletins and other publications of agricultural agencies. However, for such innovations as antibiotics, chemical sprays for insects and diseases, and certain types of new equipment, educational agencies frequently give way to commercial firms as the main influence among the innovators. The comtition among commercial firms is so great that they get farmers to try their new products before state and federal agencies can test and recommend them for general use.

For the majority of farmers, agricultural agencies tend to be most important in providing information about new practices after farmers have become aware of them through other sources, and in the trial stage when they seek specific information about how and when to put the practices into operation. (31) However, Rogers and Beal find that agencies are most important in the awareness stage of adoption of 2-4-D weed spray than in later stages. (15) Due to the lack of comparable data for a wide range of new practices, only very tentative conclusions can be drawn about the role of educational and service agencies in the acceptance process. Whether agencies are important in making farmers aware of new practices is likely to be associated with the extent to which agencies use media which enable them to disseminate information quickly to most farmers. The importance of agency persons in the trial stage of adoption no doubt reflects the widespread use of the demonstration method by these agencies. This is the point at which the farmer often requires information about the application of the new practice to his particular set of circumstances; two-way communication through personal contact with an informed person either by phone, in the office, or elsewhere, is needed.

A further word about the relationship of the educational and service agencies to the people they serve: Most studies have shown that the Agricultural Extension Service has effective contact with those of the middle and upper socio-economic groups. (7, 16, 32) Vocational agriculture institutions and certain of the federal service agencies tend to be less selective with respect to the social and economic status of the people served. Nevertheless, there is evidence that the educational agencies tend to be oriented to "middle-class" interests. This is due in part to the fact that this is the class from which most county extension agents, vocational agriculture instructors, and other agency personnel, whose interests and values are similar, are recruited, and to the fact that it is the middle and upper socio-economic levels which have the aspirations and the means to make the recommended changes. Low-income or low-participating families frequently do not know about agricultural agencies or if they do know about them they have unfavorable attitudes toward them. Such attitudes may result from the feeling that the agency is identified with and serves the interests of another "class" of farmers, or from the disagreement with agency objectives or procedures. The effort on the part of the Extension Service and the Soil Conservation Service, as well as other agencies, to plan and develop their programs through local sponsoring groups is one way of overcoming the hiatus in objectives and norms between agency and clientele, thereby establishing more effective working relationsips.

Recent studies suggest that one of the main problems of agency workers is that of gaining acceptance for the role in which they view themselves. (37) Most extension workers would like to spend more time teaching basic principles of farming rather than making recommendations for the solution of specific problems as they arise. The use of local sponsoring groups will not necessarily aid in this direction unless effort is placed upon changing their perception of the role of extension workers from that of performing an advisory service to that of performing education in the newest ideas and developments.

The Mass Media

The mass media cover a wide range of types of communications channels. They include the written word of newspapers, magazines, and pamphlets, the spoken word of the radio, and the combination of the spoken word with the visual image of television. In the United States most of these media are operated commercially with attendant emphasis upon appeal to the largest possible audience in a manner which will lead to favorable associations with the products advertised. The implications of the commercial enterprise for educational programs need little elaboration. The commercial mass media cannot afford to take the reader or listener further in the exploration of new ideas and techniques than he can be enticed into going, without losing his attention to one of the many other competing stimuli. They do not provide the primary rewards which personal contact with friends and neighbors provide, nor do they ordinarily provide the rewards of recognition, technical assistance, and access to money or other resources of the educational and service agencies.

For the most part, the mass media appeal to individuals rather than to groups. They provide for an appeal to the individual's emotions first, in order to hold his attention, and to his intellect second. Nevertheless, the mass media provide the news and personalized stories whereby the individual is oriented to the world about him and whereby he can develop identifications and reference groups which provide both information and motivation for goal attainment. For this reason, mass-media communications usually appeal to the individual as a person who is a parent, spouse, lover, sports fan, church member, citizen, etc., as well as a farmer, laborer, or businessman. Thus, the acquisition of knowledge and understanding of new ideas in farming is not likely to make up a very high proportion of the time or effort spent by the average farmer in contact with the mass media.

Due to their almost universal appeal and availability, the mass media have provided the means for quick and widespread dissemination of that information which can be sandwiched between entertainment, news, and commercials. It is the timely information about markets and weather which receives widest attention on the part of the farmer. Studies show that the radio and now television are primary sources of market and weather information with newspapers and magazines providing supporting information and forecasts of a more long-term nature. Educational farm and home programs which have been highly personalized and integrated into ongoing activities are effective in reaching wide audiences, as are farm and home programs originating on college campuses. (5,32) The effectiveness of the mass media appears to be closely related to the extent to which confidence is built up in them because of the person or the institution with which they are associated and because of the personalized content of their communications.

Television has opened new vistas in the mass-media field in which close-up views of demonstrations can be combined with personal accounts and expert information. Its effectiveness has been demonstrated in a wide range of practices including the care and use of machinery, soil management, livestock care and feeding, meat processing, building repair, and farm management. However, the high cost of programming limits the extent of its use for educational purposes. Only those ideas and practices of most widespread application are likely to be effectively disseminated by this media. The adaptation of the ideas and practices to local situations must still be made by means which can take into account more effectively local conditions and the particular interests of the farmer.

The mass media provide information at all stages in the process of acceptance of new ideas. However, they appear to be most effective in making people aware of new ideas and techniques. This is particularly true for those new ideas and practices which lend themselves to communication by one or more of the mass media, either because of widespread interest in them, simplicity of the innovation or change or because of the dramatic nature of the innovation. Insect and disease control measures are particularly adapted to dissemination through the mass media since interest is usually high when insect or disease damage is prevalent and information can be disseminated quickly through the radio, television or newspaper. Also, new control measures for such practices may require little more than a change of materials or method of application. Initial information about such complex practices as the seeding of permanent pastures and changing from one-crop farming to livestock is frequently provided by radio and farm papers because of the dramatic nature of the personal accounts of those who have made this type of change. The mass media using visual techniques are particularly adapted to the dissemination of information about new mechanical devices, plant and livestock types, and physical arrangements. The influence of personal interest in the use of the mass media is further revealed by the attention given to programs and articles on such matters of general interest as social security, farm safety, and health.

While the mass media are probably most efficient in the awareness stage of the acceptance process, they are also effective in the other stages. As in the case of insect and disease control measures they are effective in the trial stage when knowledge of how and when to use the materials is important. But, more than that, the mass media provide continuous stimuli to the person at all stages in the diffusion process, although the ideas, facts, and opinions which they provide must be sifted through the farmers' thoughts and experiences before they become effective. Several studies suggest that after reading about or hearing about new things, farmers talk to friends and neighbors or to the county agent about them before taking any action. Only the well-informed and independent farmers are likely to adopt a change on the basis of impersonal sources of information without discussing it with persons in whom they have confidence. The ideas provided by the mass media do not become effective until they become a part of the institutional or social system of family, community, and farm.

No definite generalizations can be made about the role of the mass media in the dissemination of information from innovator to the late adopters because of the wide range in the functions of radio, newspaper, farm papers, magazines, and television. The innovator appears to read widely and get much of his information from the more specialized farm journals, organization papers, college publications, and some from commercial pamphlets. However, there is evidence that the majority depend more upon the mass media for initial knowledge about new ideas than do the innovators or early adopters who depend upon the educational agencies.

The use of the mass media is highly influenced by educational level. The better educated tend to make more use of the written word and the less educated depend more upon the spoken word. This association between education and mass media use is most striking in those areas where educational levels are low, with most not having attended high school. Also, the older farmers tend to depend more upon the mass media than the middle-aged or younger farmers, suggesting that they are utilized more by those less active physically and socially.

With the development of television and many forms of publications it is likely that a greater degree of specialization will develop in the use of mass media by the farmer. A recent study shows that radio listening and reading are highly associated while television-viewing time is negatively associated with time devoted to both reading and radio listening. (6) This suggests that people come to depend upon certain media according to their interests and attitudes. Perhaps the more active person is less likely to want his information, as well as entertainment, spoon-fed while his more passive cousin is willing to be exposed to anything that isn't too unpalatable.

Buying and Selling Firms

Most new agricultural practices involve the use of materials or equipment which must be obtained from commercial sources. The stake of the dealer in promoting new practices of course varies greatly. New equipment, new seeds, fertilizers, and chemicals are all highly competitive items among commercial firms. The question is to what extent the commercial firm promotes new materials and equipment as opposed to selling more of the old. While the advantage may be greater in continuing to sell the old, a successful business requires that new materials and equipment be promoted to expand the market opportunities and to prevent competitors from attracting customers. Hence, commercial firms have a vested interest in the promotion of new farm practices in order to hold as well as to expand their market.

How does the structure and functioning of commercial firms affect their role in the process of acceptance of new ideas and techniques? It is stating the obvious to say that commercial firms, except for farmers cooperatives, are motivated by the opportunity for profit. With this assumption one might ask how the buying and selling functions influence the dissemination of information about new ideas.

As with other communication channels, commercial firms vary widely in their form and functioning. In the first place, they vary in the extent to which they are identified with the local community -- its norms, values, and social structure. This affects the extent to which they have an accepted role in the community. The operators of most feed, seed and supply stores, the milk plant, and the cotton gin are usually local residents and are likely to have social as well as business contacts with the farmers with whom they deal. Relationships with this type of commercial dealer are likely to be highly personal and not as likely to involve the exchange of information about new practices. Their places are frequently the meeting place for farmers for the exchange of ideas and experiences.

In contrast, there is the centralized seed, feed, fertilizer, or chemical supply firm with field men, demonstration plots, and literature providing technical assistance and information to farmers over a wide territory. Contacts with firms of this type are likely to be more impersonal and transient, based upon contract rather than upon confidence established through personal relationships over a period of time. Nevertheless, their impact may be greater in initiating new ideas because of the scope and organization of their effort.

The role of the commercial dealer in the process of acceptance of change varies greatly with the type of practice or change. Commercial firms and their representatives have been found to be highly influential in the adoption of such innovations as new crop varieties including hybrid strains, fertilizers, new equipment, new feeds, and chemical compounds for disease and insect control. (16, 32, 33) Commercial firms have been most successful in advancing innovations which produce dramatic results and yet which cannot be obtained except through commercial channels. It is these products which are frequently disseminated before adequate tests can be made by experiment stations to insure their soundness, and to prevent the use of those which are not adapted to particular conditions. As farming becomes more highly commercialized and specialized, the role of commercial firms in the development and diffusion of new ideas and practices is likely to increase. Commercial firms can adapt themselves to the specialized interests of farmers covering a wide area. They can appeal to the interest of the large-scale operator for whom the adoption of innovations is largely determined on the grounds of costs and returns rather than upon other considerations.

The influence of commercial firms in the process of acceptance of course varies with the means employed by the firms. Certain studies show that salesmen and commercial firms have been the most important source for initial knowledge about certain new practices. (3) This has been the case where campaigns have been employed with a large staff of field men.

Commercial sources are less likely to be regarded as influential in the decision-making stage than at other stages since this is the point at which the farmer's interests and those of the dealer are competing. The farmer is not likely to depend heavily upon the recommendation of the commercial dealer to adopt a particular practice. However, milk plants have been influential in farmer decisions to adopt the use of bulk tanks through various forms of incentives. Once the decision is made to try a new practice, information about how and when to put it into effect is needed. The dealer is in a crucial position to supply this type of information needed to complete the purchase of the material or equipment and at a time when interest is highest. An investment of money has been made and the farmer wants to make the best use of it. Furthermore, the information can be obtained through the dealer incidental to the purchase or sale of products without having to be placed in an information-seeking role with respect to agency officials or other farmers.

Hence, it is not surprising that a majority of farmer samples have been found to rely upon commercial firms for specific information about how to apply certain new practices. This is in keeping with the role in which many dealers see themselves. A pilot study of commercial fertilizer dealers reveals that most dealers feel that farmers expect them to be "a reliable source of information on farming" and almost all felt that they should provide technical information on fertilizers. (3) This suggests a high degree of consciousness on the part of commercial dealers to provide information which leads to the sound use of their products over a long period of time. This indicates an awareness of the cumulative effect of initiating sound practices or in another sense, an awareness of the communality of interest of the buyer and seller of farm products and the farmer. The movement toward vertical integration in which commercial firms finance the production of poultry, livestock, and other products is not too surprising when regarded from this point of view.

Informal Group Contacts (Other Farmers)

Communication occurs as a part of the everyday interaction among friends, neighbors, and farmers who see each other through personal units and through contacts in trade centers, at sales, social gatherings, and at other affairs. These contacts range from those among intimate friends and family groups to the casual contacts at the market place or in connection with the meetings of organizations. As with the other types of communicating agents, the role of the contacts with other farmers varies with the nature of the groups within which these contacts occur. The casual contacts before and after organization meetings might be impersonal and transient, in contrast with those between friends and family members.

Certain characteristics of the groups of which most farmers are a part influence their role in communicating information about new ideas and practices. In the first place, only a small part of the communication among farmers who meet as friends, neighbors, or associates is likely to pertain to new developments in agriculture. Most personal contacts among friends or peers is likely to be of a social or expressive nature which performs an integrative rather than an instrumental function for the interacting parties. Hence, a friend is not likely to tell another directly about a new idea or practice if this is likely to place one or the other in a subordinate position or to arouse strong differences of opinion.

Information about new ideas is more likely to be communicated among the members of informal groups when the interests of the group are similar. Contacts among farmer cliques made up of similar ages and interests are likely to be different than those among groups made up of varying ages and interests. Lionberger and Coughenour have shown that farm information is more likely to be transmitted among clique members than among neighbors or among farmers who are not members of an identifiable informal group. (17) Similarity of farming interests among informal associates is also more likely to contribute to the transmission of information about new ideas in farming.

The norms of the informal group are likely to influence the communication of information about new ideas and practices. Wilkening, Marsh, and Coleman have found that functional leaders in some neighborhoods were not any more advanced than their neighbors in the adoption of new farm practices while in other neighborhoods they were. (20, 36) A. W. van den Ban also finds in the Netherlands that communication among farmers about new practices is more effective in a community near an urban center than in an isolated community. (30) These findings suggest that communication about new farm practices occurs when such communication is sanctioned by the group and in keeping with the relationships among its members. Communication about new ideas occurs more frequently among informal group members in which status in the group is based upon achievement rather than upon ascribed characteristics.

Information about new practices which are closely associated with existing practices, i. e. changes in materials or equipment without changes in techniques or skills (new seeds, feeds, chemicals, etc.) are most likely to be transmitted through informal channels. On the other hand, those innovations which represent changes in operations as well as changes in materials and equipment are less likely to be transmitted through informal channels, since such changes are likely to require more information and assistance than other members of the group can provide, and because such changes are likely to be more disruptive of relationships among its members.

Finally, the nature of the connections of members of the informal groups with external sources affects their role in the dissemination of information about new ideas and practices within the group. If influential members of the group have no effective contacts with agencies or with other sources outside the group, there is likely to be little gain in new ideas through the interaction of its members. The range and frequency of such contact by members outside the group will affect the role of informal contacts in the diffusion of new ideas.

With this brief background, the specific nature of informal group contacts in the dissemination of farm information will be presented in the form of a few tentative propositions.

1. Most farmers tend to look to other farmers slightly above them in social and economic status, yet having similar norms and aspirations, for information about improved techniques in farming. This means that there are influential persons at all levels with some having a wide range of influence and others who influence only a few farmers.

2. Social cleavage based upon race, language, and other distinctions act as a barrier to informal contact and communication about farm matters. Since informal contact occurs largely among social equals, distinctions of class, nationality, etc., tend to inhibit informal communication of new ideas.

3. Personal contact for farm information tends to follow the channels of contact established for other functions, i.e. visiting, work exchange, recreation, church, organization meetings, etc.

At what stage in the process of acceptance of new ideas and practices is informal contact with other farmers most important? Studies by rural sociologists and others have shown that personal influence is predominant at certain stages in the adoption process. (22, 26, 31) For those practices associated with existing ways of doing things, such as a change in crop variety or a change in cultivation practices, personal contact is important in making people aware of them. (32, 33) However, it is in the decision-making stage that personal influence appears to be greatest. After learning something about an innovation through the mass media, agricultural agencies, or through other sources, most discuss it with personal associates before deciding to try it. These are likely to be other farmers who have had experience with the practice under local conditions. But, most farmers want to know how their friends feel about a new idea before trying it. The adoption of a new practice may tend to alienate associates who do not wish to or cannot go along with the change. The writer has observed a group of neighbors the members of which all decided to change to a new tobacco variety the same year rather than one trying it out first.

While all persons are influenced by personal contact, it is obvious that all could not depend upon personal contact with other farmers for their information about new ideas and techniques. The innovators depend little upon personal contact with other farmers while the followers depend most upon such contact. For some practices, the majority depend largely upon personal contact, particularly in evaluating them and in learning how and when to put them into operation. It is those who are the least educated, therefore, who do not utilize written sources and those who do not have contact with formal groups, institutions, and agencies who depend most heavily upon personal contact in all stages of the process of accepting new agricultural practices.

2

Summary

The communication of information about new ideas and techniques in agriculture is viewed both as a mental and as a social process which occurs over a period of time. Different information sources may (a) stimulate awareness, (b) provide the facts, (c) assist in deciding whether to adopt the new idea, and (d) provide the specific information about how to put it into operation. The mass media tend to be most effective in making farmers aware of new ideas, educational agencies in providing technical information about them, other farmers in helping to decide whether to adopt them, and commercial sources in providing information on how and when to put certain of them into operation. Also, different information sources are utilized by the initial adopters of new ideas than by those who adopt later. Initial adopters tend to be influenced most by educational agencies and by printed materials which introduce new ideas from a wide range of sources, while the later adopters tend to be influenced by personal contacts with other farmers. However, the wide variation in the nature of the agencies of communication cautions one against making generalizations about their role in the diffusion of new ideas and techniques.

The influence of communicating agents varies with certain personal and social characteristics of the farmer. Those of middle and upper social and economic levels are most likely to be influenced by the educational and service agencies and by written materials. Those of lower social and economic status depend more upon personal contact with other farmers for their information about new ideas. The clientele of institutionalized sources of information varies according to their identification with local needs and interests and with the particular means of communication employed. The audience of the mass media also varies according to the form and content of the communications. The influence of other farmers varies with the structure and function of the group within which the contacts occur. The influence of contacts within these groups is positively associated with the extent of contacts of the members outside the group.

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CHARACTERISTICS OF AGRICULTURAL INNOVATORS AND OTHER ADOPTER CATEGORIES

EVERETT M. ROGERS

Dr. Rogers is associate professor of Rural Sociology at the Ohio State University and the Ohio Agricultural Experiment Station. An earlier version of this report appeared as a research bulletin of the Ohio Agricultural Experiment Station.

CHARACTERISTICS OF AGRICULTURAL INNOVATORS AND OTHER ADOPTER CATEGORIES (1)

by

Everett M. Rogers

> At 5:30 one frosty Indiana morning last week, Farmer Warren North rolled out of bed to get at his chores. After a hearty breakfast, he left his twelve-room white frame and fieldstone house, walked briskly to the barnyard. In the early morning mist the low-lying white barn, surrounded by five giant blue-black silos, rode the frozen prairie like an ocean liner. Like a rumble of surf came the hungry bellowing of 400 white-faced Herefords and the grunting of 500 Hampshire hogs, waiting at row on row of troughs to be fed. In the barn, North stepped up to an instrument panel as intricate as a ship's, began pushing buttons and pulling switches. All around, the barn came to vibrant life. From one side dropped ground corn, from another silage, from a third shelled corn. A snakelike auger propelled the feed up a steep incline and sent it tumbling out through a conduit that passed directly over 330 feet of feed troughs. At regular intervals, trap doors automatically distributed the individual animal's feed.
>
> Ten minutes later, Farmer North was through with a job that would have taken five men half a day working with buckets and pitchforks. He returned to his farmhouse and poured himself another cup of coffee. While it cooled, he read a story on the "farm problem" in the Wall Street Journal. Farmer North is a symbol and a prime example of the profound changes that have been wrought in U. S. agriculture by mechanization and automation.... [Time, March 9, 1959]

Introduction

New technological ideas in agriculture flow from agricultural scientists to farmers. The process by which new ideas spread is called diffusion. There are many communication channels in this process between scientist and farmer. Mass media such as farm magazines, bulletins, and radio and TV farm programs play an important role. Employees of such government agencies as the Extension Service attempt to communicate new farm ideas and obtain their adoption. These agricultural workers are one type of change agents, professional persons who attempt to influence adoption decisions in a direction they feel is desirable. A farmer's neighbors, friends, and relatives are also important channels in the diffusion of farm innovations.

Past research findings indicate that all farmers do not adopt an innovation at the same time. The earliest 2.5 per cent of the farmers to adopt new farm ideas are called "innovators". The next 13.5 per cent are termed "early adopters". "Early majority" are the next 34 per cent to adopt, and "late majority" are the next 34 per cent. The last 16 per cent of the farmers to adopt new farm practices are called "laggards". (2) These five adopter categories are classifications of individuals within a social system on the basis of innovativeness. Innovativeness is defined as the degree to which an individual is relatively earlier to adopt new ideas than the other members of his social system.

Purpose

A basic principle in propaganda efforts, public relations, and advertising is to "know your audience". It would seem important to know the characteristics of agricultural innovators and other adopter categories. Then, certain target audiences might be selected and particular communication methods chosen to reach them.

The purpose of this chapter is to determine the characteristics of innovators and other adopter categories. Special areas of investigation are personal characteristics, communication behavior, and social relationships.

How the Study Was Done

The commercial farmer sample

Data for the present study were obtained by personal interviews with a state-wide random sample of Ohio farm operators. In order to be eligible for inclusion in the sample, a respondent must have (a) farmed more than 20 acres, and (b) worked off the farm for pay fewer than 100 days per year. This yielded a sample of 104 respondents who were essentially "commercial farmers". (3) Each commercial farmer in Ohio had about one chance in 410 of inclusion in the sample.

The major dimension of analysis throughout this publication is innovativeness. The 104 respondents were categorized as innovators, early adopters, early majority, late majority, and laggards on the basis of an innovativeness scale. This scale was composed of 25 new farm ideas that were suggested by Ohio Agricultural Extension Service specialists such as weed sprays, crop varieties, livestock disease control methods, fertilizers, and new farm equipment. The validity, reliability, and unidimensionality of this scale are discussed elsewhere. (4)

The innovativeness scores measured the tendency for individuals to adopt new farm ideas relatively earlier or later than other Ohio farmers. Respondents with the highest scores were the first farmers (relative to other farmers in the sample) to adopt new ideas; they are the innovators.

The innovator sample

This method of adopter categorization yielded only three innovators out of the total sample of 104 commercial farm operators. This was too small a number of innovators to furnish accurate estimates of their characteristics. Most past diffusion investigations have included so few innovators that little is known about this adopter category. There was a need to "fatten up" the present sample of innovators. Because of their relatively small numbers in the total population, it would have been necessary to interview 1, 000 farmers to obtain as many as 25 innovators.

An alternative procedure was utilized, however, which yielded a sample of 96 innovators out of a total of 146 farmers interrogated. This "short cut" was accomplished with little bias in the sampling procedure. In order to obtain the names and addresses of innovators, personal interviews were completed with a state-wide random sample of 44 of the 88 county Extension agents in Ohio in 1957. (5) The county agents seemed able to answer this question easily; in a few minutes of interview time they were able to list the names of more than three innovators per county. The county agents had been exposed to a training session on the role of agricultural innovators about a year before the interview and seemed to have a good idea who the innovators were in their counties.

The 150 innovators "nominated" by the 44 county agents were sent a mailed questionnaire in 1957. Responses were received from 146, a response rate of 97 per cent. This high rate of response to the mailed questionnaire suggests one important characteristic of innovators. They are "research-minded" and willing to cooperate in a research study.

As one portion of the mailed questionnaire, the nominated innovators were administered a shortened form of the 25-item innovativeness scale. The innovativeness score limits for the innovator category had been established for the previous commercial farmer study already described. In order to qualify as an innovator, a farmer (nominated by his county agent) was required to score above 5. 42 on the innovativeness scale. Out of the 146 nominated innovators, 50 failed to qualify as innovators and were discarded. The 96 remaining met the criteria and are included with the three innovators contained in the commercial farmer sample to form a total of 99 innovators. They are referred to in the remainder of this chapter as the "innovator sample".

It must be pointed out that there is a source of bias in the selection of these innovators. There are no farmers in the innovator sample who are not innovators (on the basis of their innovativeness scores). However, there may be many innovators in Ohio who were not included in the innovator sample because they were not nominated by their county agent. The extent of this bias is difficult to estimate. However, there is reason to think it might not be serious. (6) County agents might be expected to nominate innovators who were especially "Extension-minded". Responses to several questions on the mailed questionnaire, however, indicated that a number of the innovators were rather critical of their county agent and that many innovators were nominated who were not particularly Extension-minded. Because innovators are such highly "visible" persons (as will become apparent in later discussions of their characteristics), it is quite likely that county agents would know the innovators in their county even though these farmers did not work closely with the Extension program.

Personal Characteristics

If one is to beam communication messages at certain audiences within his total constituency, he must be able to recognize these audiences. Thus, it is important for him to know the personal characteristics of the adopter categories. These personal characteristics may also help one determine which communication method to utilize in order to reach a certain adopter category. For example, if it is found that many innovators possess a college education while the average farmer has only an eighth-grade education, one may beam his message at a higher level for the innovators.

Age

Past research findings have not been entirely consistent as to the relationship between age and innovativeness. Most studies, however, have found that older farmers are less likely to be innovators and more likely to be laggards. The socialization of personality occurs mainly in early life. In a rapidly changing culture, this means that younger farmers learn more modern cultural values than do older farmers, who were socialized in an earlier era. Because the young are less conditioned by the older culture, they might be expected to be more innovative.

Figure 1 shows that innovators and early adopters are younger than other farmers. (7) Correlation is -.316 between innovativeness scores and age, which is significant at the .01 level.

Social status

At the conclusion of each of the 104 research interviews, the interviewer

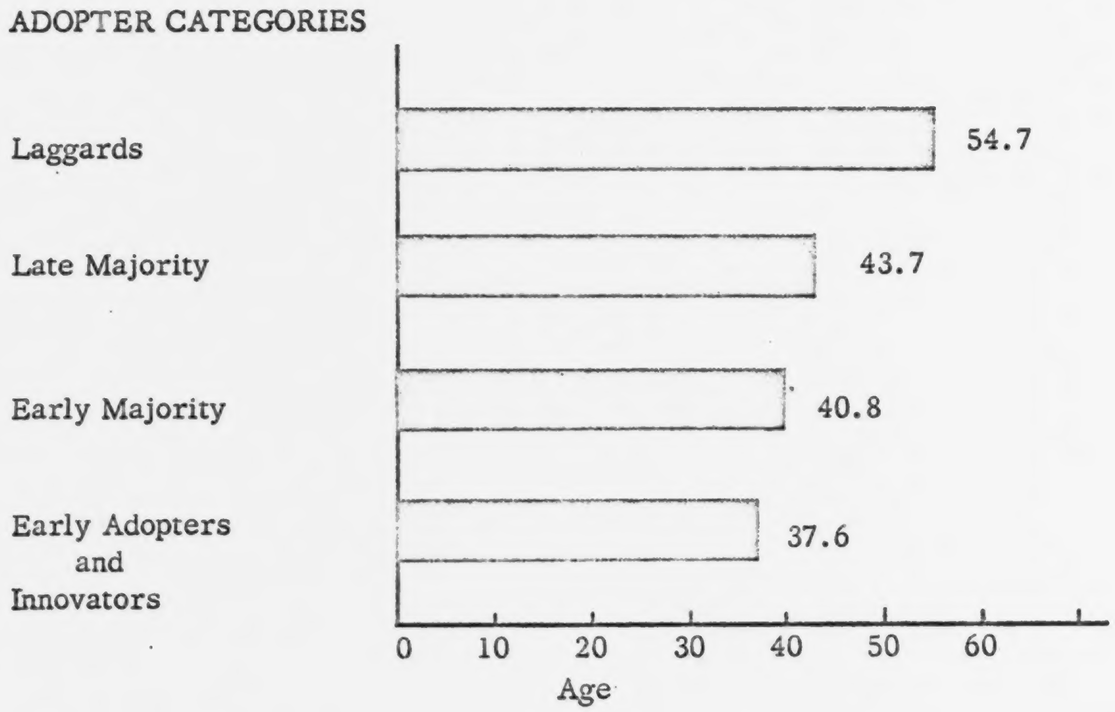

Figure 1. Average Age by Adopter Category

was asked to rate the respondent on a five-point social status scale from "high" to "low". These ratings were based on several objective criteria which sociologists have found closely related to social status in the United States. Chief among these criteria which the interviewers used were education, income, wealth, and material possessions. In some cases where two interviewers rated the same respondent, there was general agreement as to the social status rating. (8) This lends some evidence as to the objectivity of the social status rating.

Innovators and early adopters have higher social status than do laggards (Figure 2). Correlation is +.486 between innovativeness scores and social status ratings, which is significant at the .01 level. Several other variables (such as education, size of farm, and income) that will be related to innovativeness are also measures of social status.

Education

Past research findings have generally indicated that more innovative adopter categories have more years of formal education. The average number of years of education for each adopter category is shown in Figure 3. Innovators averaged 12.57 years of formal education, or slighly more than a high school education. More than 20 per cent of the innovators were college graduates. In contrast, the laggards averaged only slighly more than a grade school education. Correlation is +.523 between innovativeness scores and years of formal education, which is significant at the .01 level.

Size of farm operation

The innovators operated the largest farms in acreage and the laggards operated the smallest farms (Figure 4). Innovators farmed an average of 339 acres while laggards farmed 128 acres. This means that although innovators constitute only 2.5 per cent of the farm population, they operate about 4.6 per cent of the farm land in Ohio. On the other hand, the laggards constitute 16 per cent of the farm population, but they operate only about 11 per cent of the farm land in Ohio. Correlation is +.264 between innovativeness scores and acres operated, which is significant at the .01 level.

Another measure of size of farm is productive man work units (PMWU's). A PMWU is the amount of work performed in a 10-hour day by an average farmer with typical methods and equipment. PMWU's are probably a more accurate measure of farm size than are acres because they reflect the scope of both crop and livestock enterprises. For example, a farmer raising 100 thousand broilers on a one-acre plot probably has a larger-sized operation than a cash-grain farmer on 80 acres. Innovators have the largest-sized farms in PMWU's while laggards

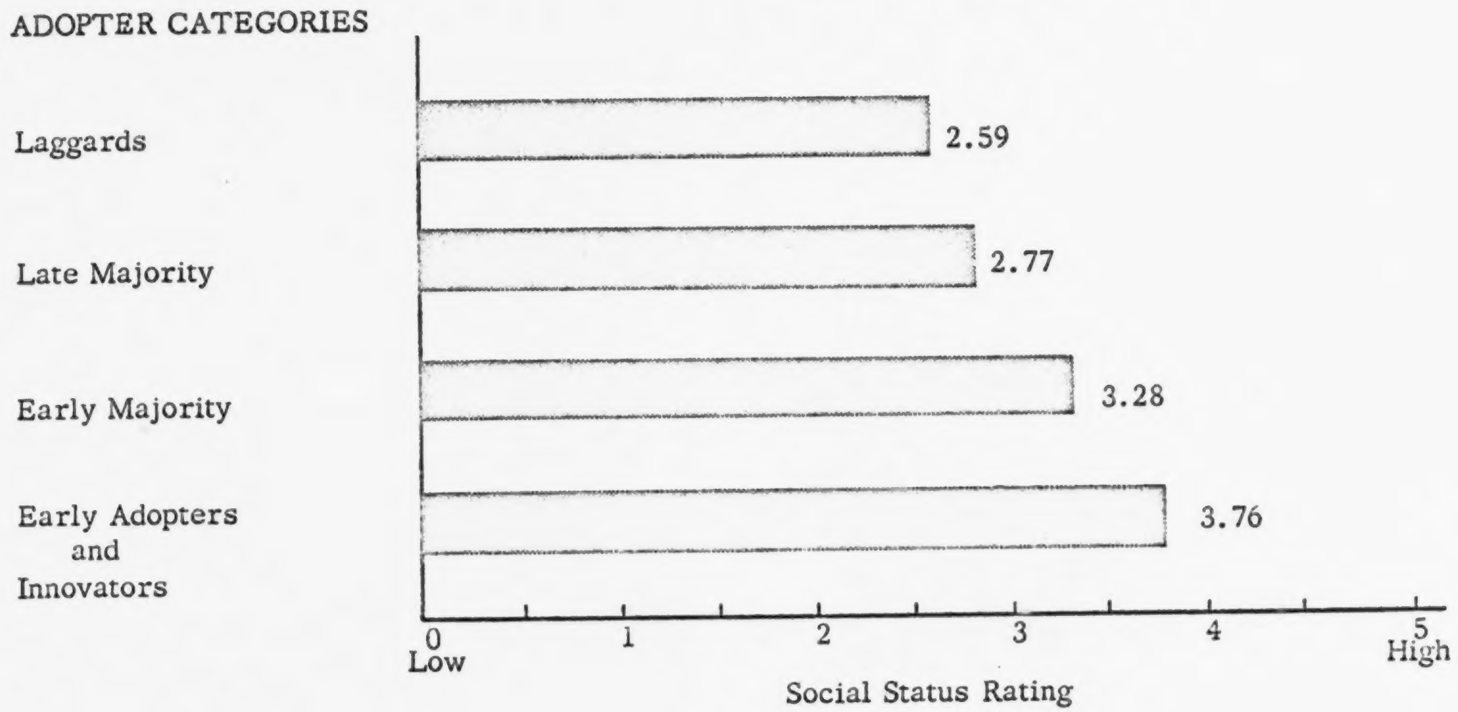

Figure 2. Average Social Status by Adopter Category

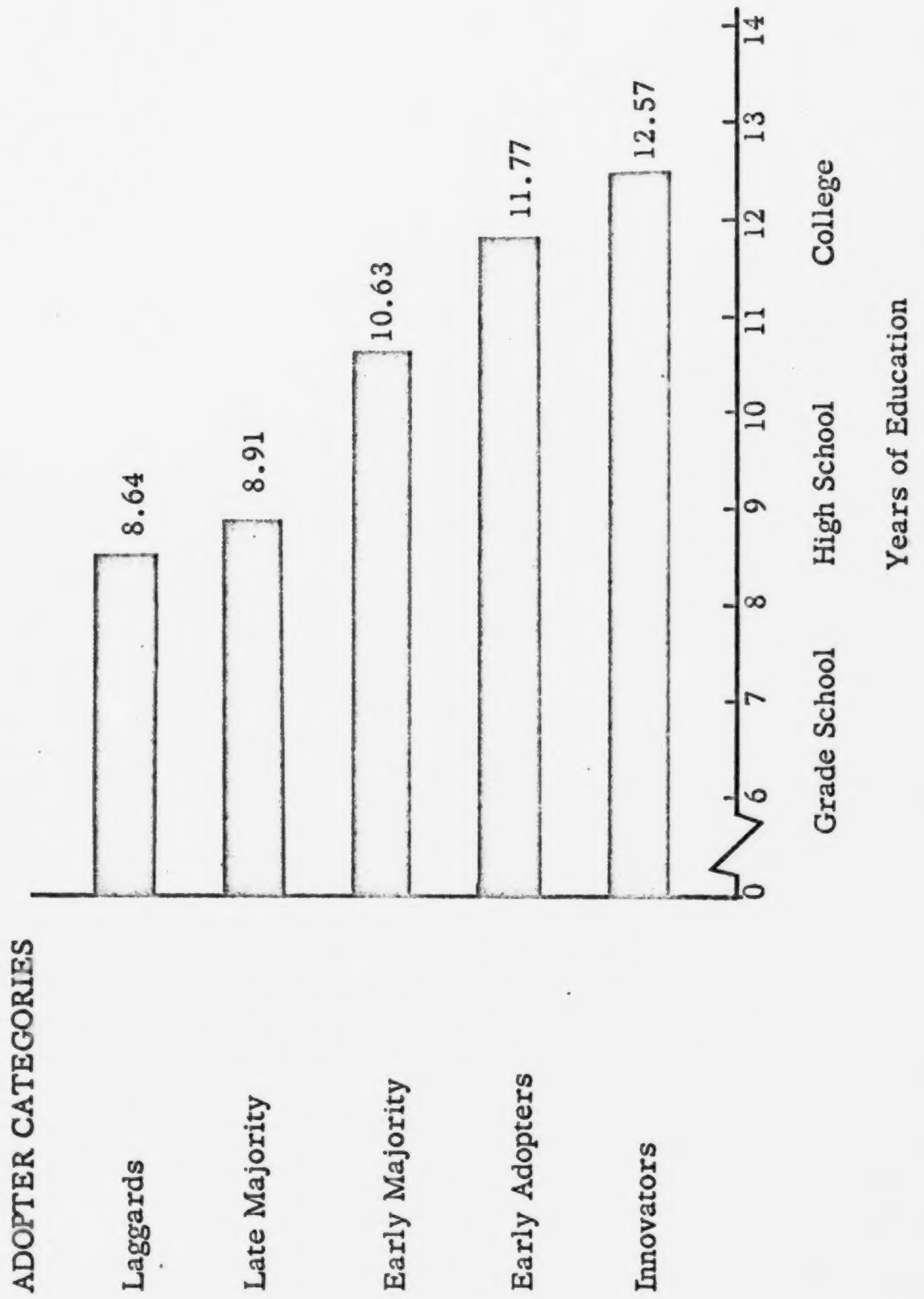

Figure 3. Average Years of Education by Adopter Category

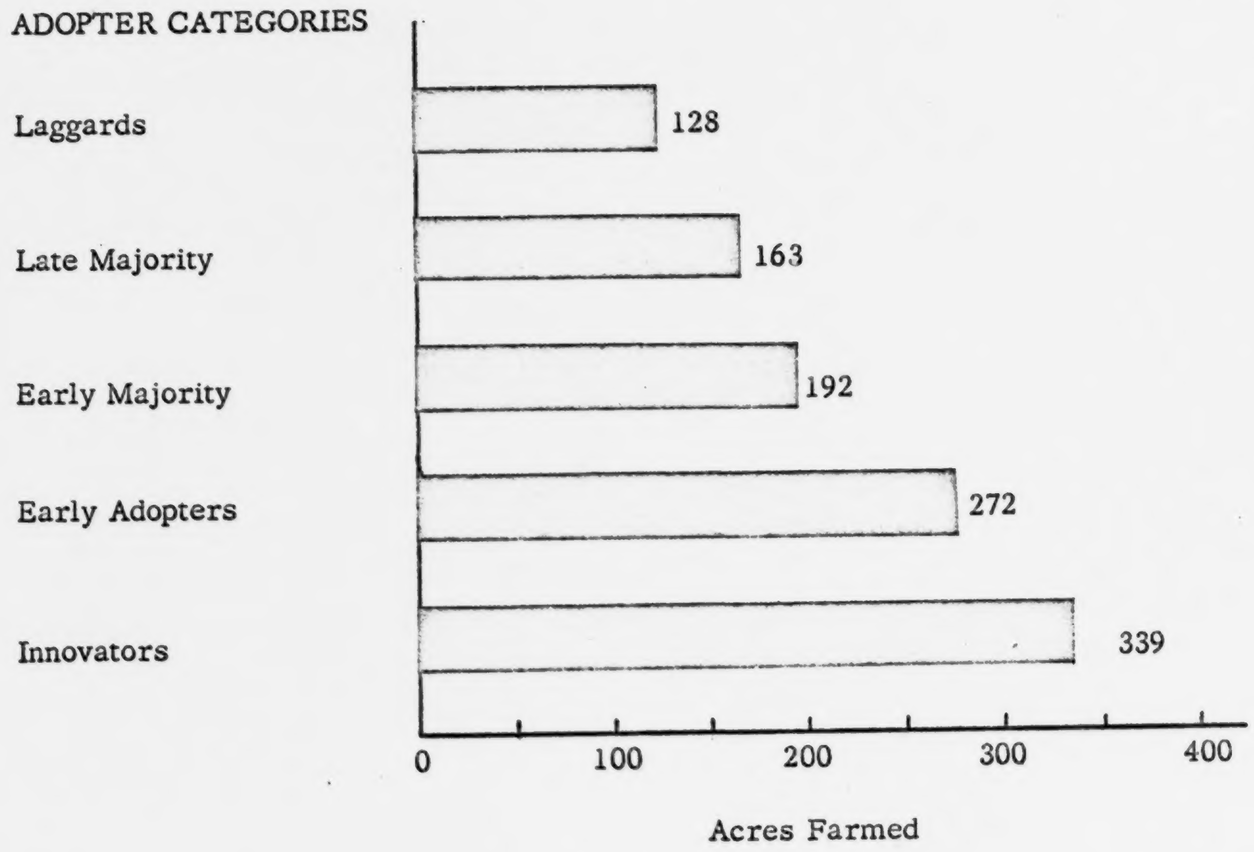

Figure 4. Average Acres Farmed by Adopter Category

have the smallest (Figure 5). Correlation is +.456 between innovativeness scores and the number of PMWU's per farm, which is significant at the .01 level.

Gross farm income

The innovators and early adopters not only operate larger-sized farms, but also earn a higher gross farm income. Innovators and early adopters averaged a gross farm income of $15,940 while the laggards averaged $4,200 (Figure 6). Correlation is +.529 between innovativeness scores and gross farm incomes, which is significant at the .01 level.

Wealth and innovativeness appear to go hand-in-hand. Do innovators innovate because they are rich or are they rich because they innovate? This cause-effect question cannot be answered on the basis of available data, but there are several reasons why wealth and innovativeness vary together. Greatest profits go to the first to adopt, so the innovator gains a financial advantage through his use of new ideas. Only wealthy farmers can afford to adopt certain innovations which require large initial outlays of capital. Because the innovator is the first to adopt, he must take risks that can be avoided by later adopters. Certain new ideas are likely to fail, and the innovator must be large enough to absorb these occasional losses. It should be pointed out that while wealth and innovativeness are highly related, economic factors do not offer a complete explanation of innovativeness (nor even approach doing so). For example, most rich Ohio farmers are not innovators.

Specialization

A farm operation is said to be specialized when one enterprise such as hogs, corn, or beef makes up a large share of the total operation. A measure of specialization was available in the present study. This index of specialization was computed as the ratio of PMWU's in the major farm enterprise to the total number of PMWU's in the farm operation, times 100. Thus, a farmer with 300 PMWU's in his feeder cattle enterprise and 500 in his total farm operation would have a specialization ratio of 60. This indicates that one enterprise makes up 60 per cent of his farm labor requirements. This measure of specialization may range from zero to 100 and is independent of size of operation; that is, a small operation may be just as specialized as a large one. Innovators and early adopters are more specialized than laggards (Figure 7). Correlation is +.424 between innovativeness scores and specialization scores, which is significant at the .01 level. Innovators, by placing "all their eggs in one basket", may find it easier to keep up-to-date in their speciality than do laggards.

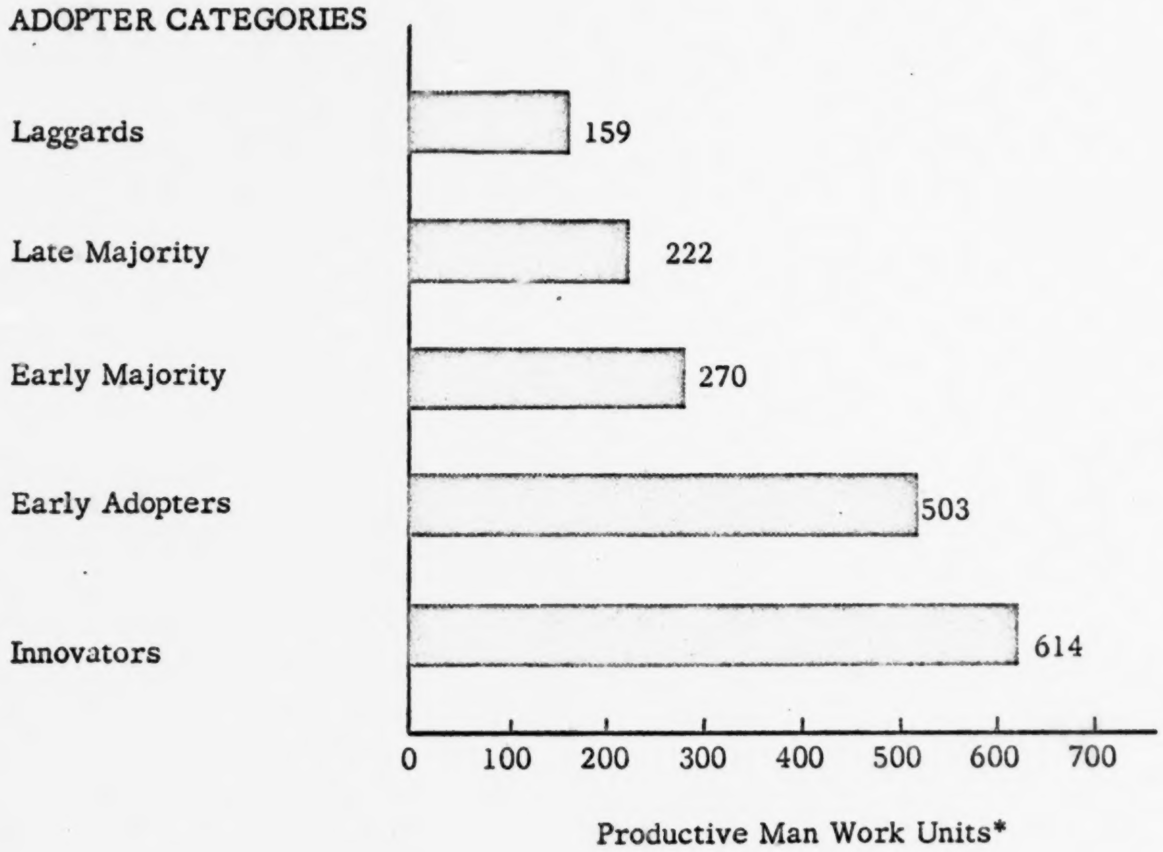

Figure 5. Average Productive Man Work Units by Adopter Category

* A productive man work unit (PMWU) is the amount of work performed in a ten-hour day by an average farmer with typical methods and equipment.

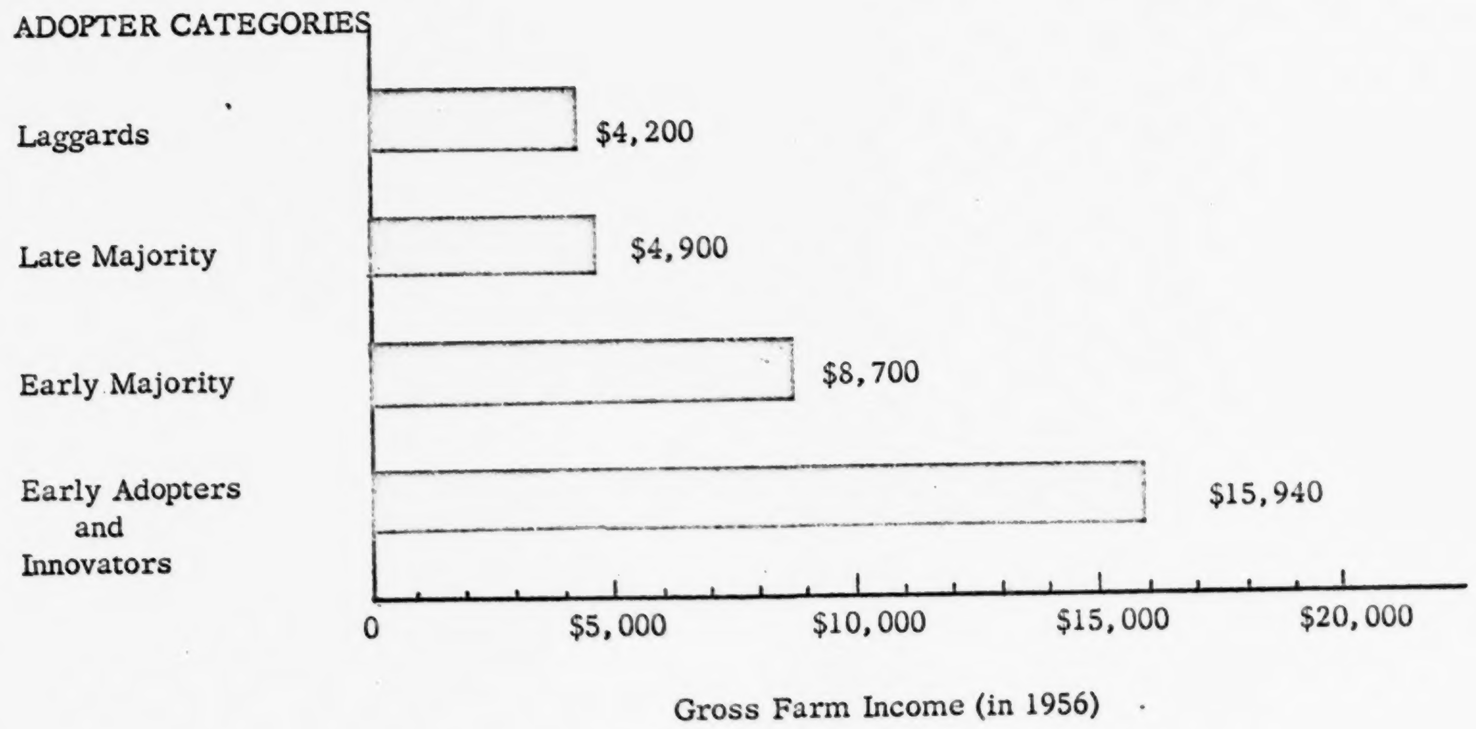

Figure 6. Average Gross Farm Income by Adopter Category

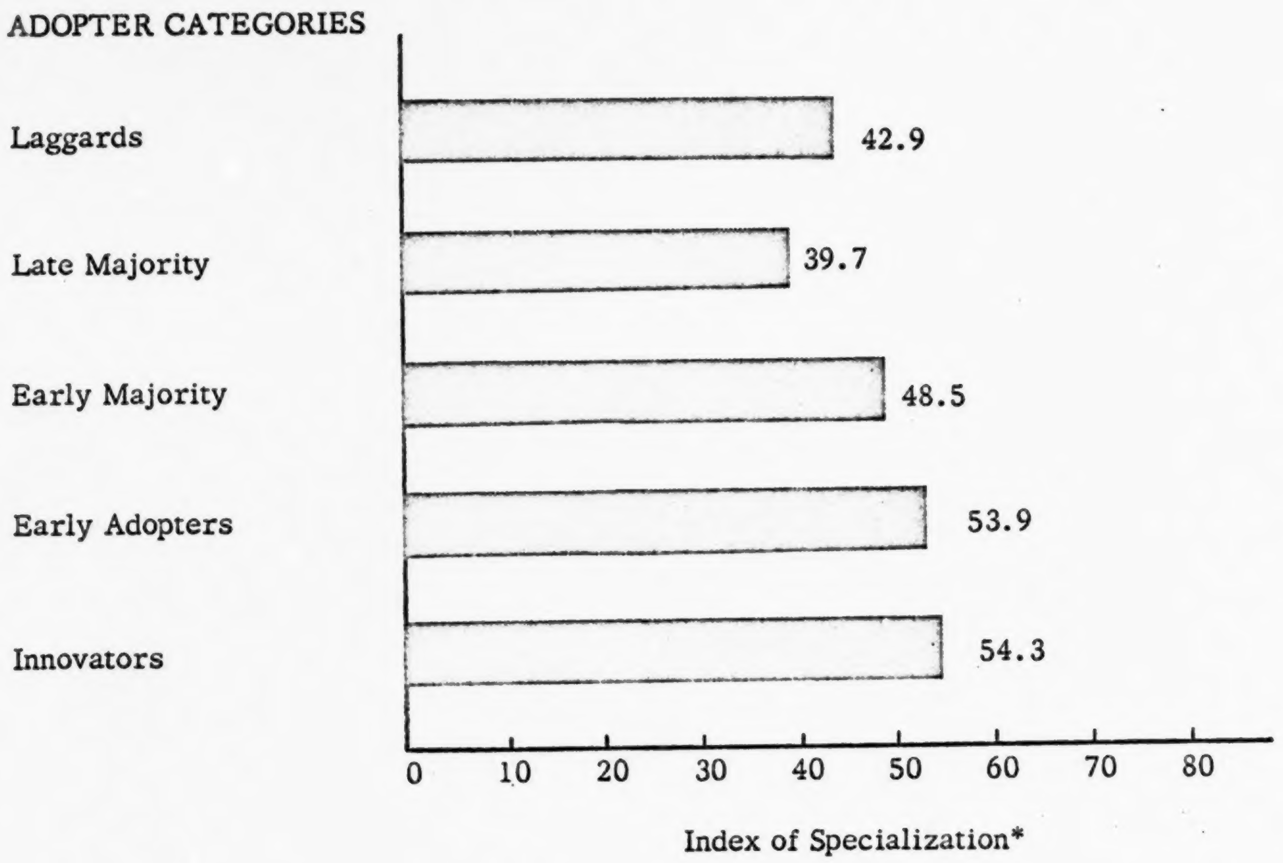

Figure 7. Average Degree of Farm Specialization by Adopter Category

* The index of specialization is computed as the ratio of PMWU's in the major farm enterprise to the total number of PMWU's in the total farm operation, times 100.

Mental ability

Innovators must be able to conceptualize a new idea and adopt it largely on the basis of mass media sources of information. They cannot imitate the behavior of their neighbors because their neighbors have not yet adopted the innovation. On the basis of this type of reasoning, one might expect innovators to possess a different type of mental ability than laggards.

The "cloze procedure" was utilized in an attempt to measure mental ability. Taylor (9) originally developed the cloze procedure as a measure of readability. In the present study, three 100-word sections of manuscript were chosen from a farm magazine, an Extension bulletin, and a research report. Every fifth word was deleted from the 300-word passage and the deleted words were replaced with standard 10-space blanks. A sub-sample of 22 respondents was asked to "close the gaps" by filling in the missing words. Each respondent's cloze score was the number of blanks (out of the 60 possible) that he could correctly complete.

The present findings indicate that while the first three adopter categories are generally similar in cloze scores, the late majority and laggards are far below the innovators, early adopters, and early majority. It must be pointed out that these findings are very tentative; they are only based on data from 22 respondents.

Taylor's (10) recent findings indicate that cloze scores not only measure differences in readability between different manuscripts but also measure individual differences in reading ability. Taylor found a very high relationship between cloze scores, I.Q. scores, and an index of technical knowledge. The present findings suggest that innovators, early adopters, and early majority may excel in intelligence as well as in reading ability. Support for this statement also comes from an investigation of cloze scores and innovativeness among Netherlands farmers.(11)

Communication Behavior

This section will show how adopter categories differ in their communication behavior.

Sources of information

The respondents were asked their most important source of information about new farm ideas. For the total sample, the most important sources (in order of importance) are farm magazines, friends, county agents, and Extension

Service bulletins. There were few major differences on the basis of adopter category. That is, one category did not depend exclusively on one source while another category depended almost entirely on a different source.

In general, however, there was a tendency for innovators and early adopters to utilize county agents more than laggards. Friends and neighbors were more likely to be used by late majority and laggards. Farm magazines were slightly more important for innovators, but were quite important for all adopter categories. Extension Service bulletins and direct contact with agricultural scientists were especially important to innovators. These findings are somewhat consistent with those of past research studies. Innovators and early adopters depend less on personal sources of information (especially from neighbors and friends) than laggards. (12) Innovators could hardly depend on friends and neighbors for information about new farm ideas, because at the time of the innovators' adoption decisions none of their peers have any experience with the new idea. However, the laggards are surrounded by legions of peers who have information and opinions about the new idea at the time the laggards adopt.

Agricultural scientists

The respondents were asked whether they had traveled directly to contact agricultural scientists within the year preceding their interview. About 10 per cent of the commercial farmers reported direct communication with agricultural scientists. Innovators were much more likely to have direct contact than any other adopter category (Figure 8). The difference is significant at the .01 level. (13)

The respondents listed a variety of reasons for seeking information from agricultural scientists.

> "I attended Farm and Home Week to learn about new silage equipment."
>
> "My problems on livestock disease eradication were answered at Dairy Day."
>
> "I drove down to see Dr. Blank about some insect control ideas."
>
> "I had questions on hay driers; the agricultural engineers consulted with me."

Innovators and early adopters are more likely to know agricultural scientists than are laggards (Figure 9). Correlation is +.353 between innovativeness scores and acquaintance with agricultural scientists, which is significant at the .01 level.

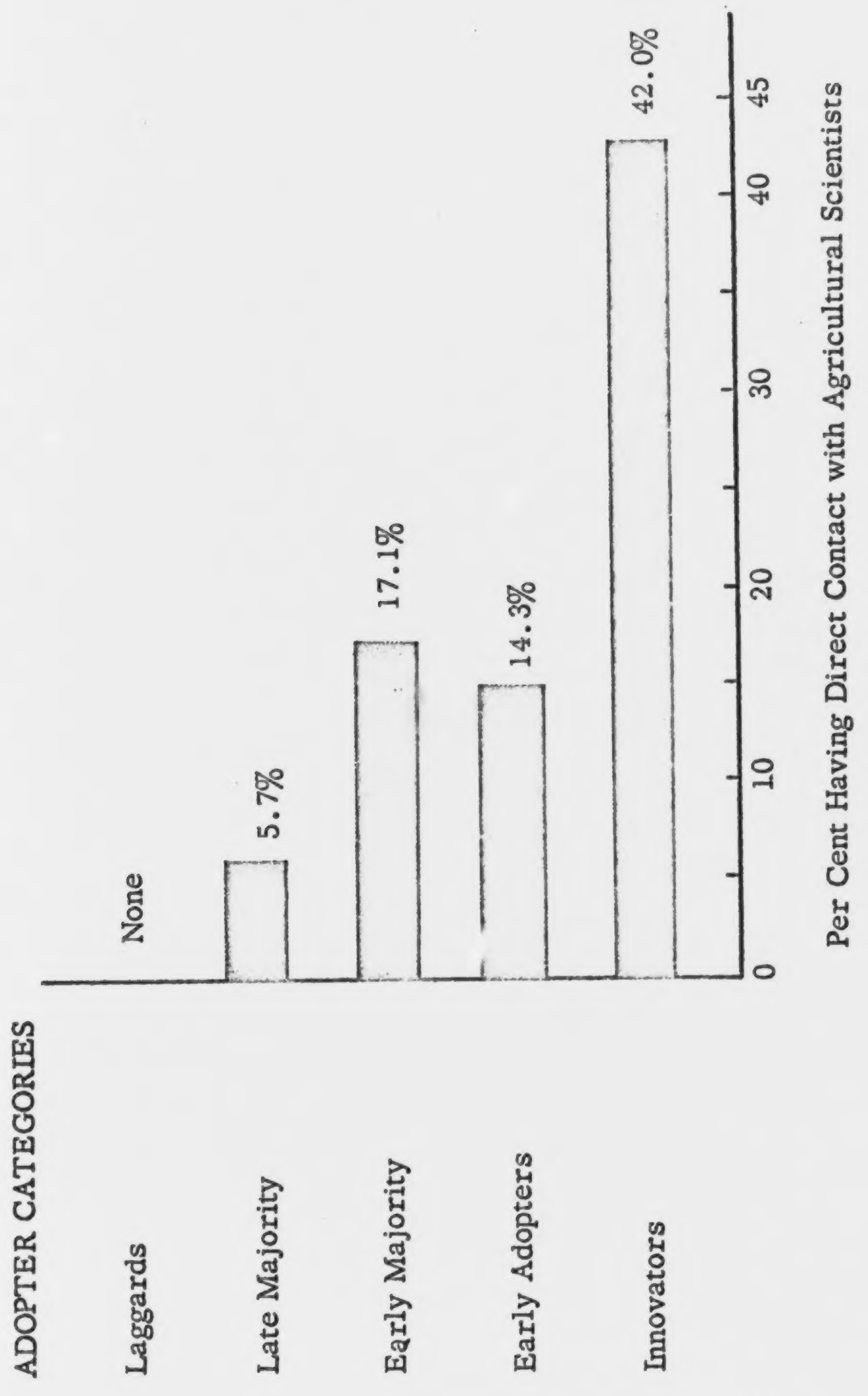

Figure 8. Communication with Agricultural Scientists by Adopter Category

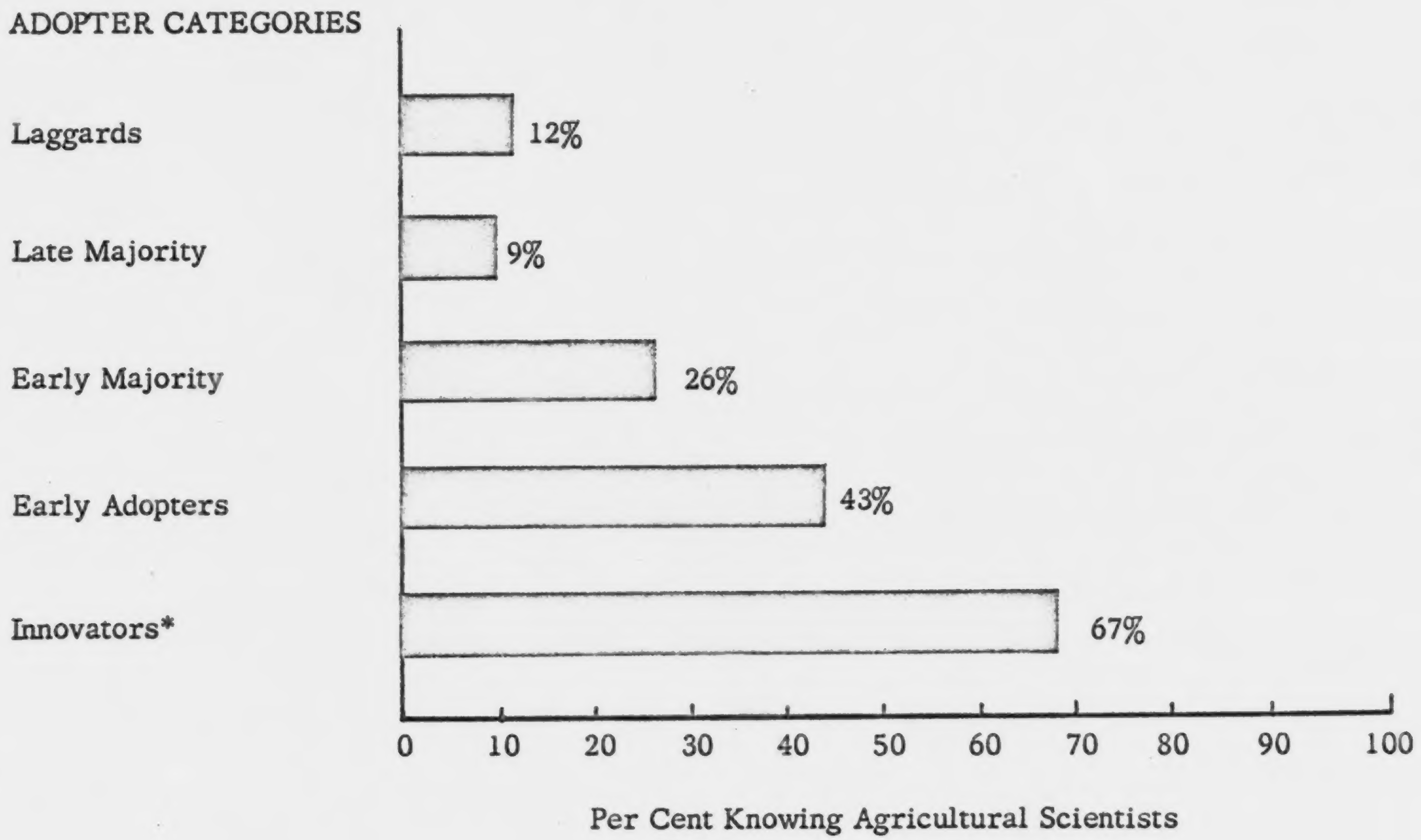

Figure 9. Per Cent Knowing Agricultural Scientists by Adopter Category

* Based on responses of only the three innovators in the commercial farmer sample.

Another way in which farmers may learn of scientists' research findings is to read Ohio Farm and Home Research. This bi-monthly magazine carries articles by agricultural scientists on current research findings. The publication is free upon request. The greater "research-mindedness" of innovators (14) would suggest that they would be more likely to subscribe to Ohio Farm and Home Research. Figure 10 shows that this is so. Differences in per cent subscribing to the publication are significant at the .01 level. (15)

Farm magazines

At the time the innovators and early adopters decide to adopt a new farm idea, one of their few available sources of information is farm magazines, whose main purpose is to communicate information about new farm ideas. The two-step flow of communications (16) would suggest that innovators and early adopters make relatively greater use of the mass media such as farm magazines.

Findings from the present study indicate that innovators subscribe to the greatest number of farm magazines and laggards to the fewest. Figure 11 shows the number of farm magazines received by adopter category. Correlation is +.206 between innovativeness scores and the number of farm magazines read, which is significant at the .05 level.

Not only do innovators read more farm magazines, but they might be expected to read different magazines. However, analysis of the data showed that there were few differences as to specific farm magazines read on the basis of adopter category. One reason for this might be the wide circulation that each of the five major farm magazines received. The average Ohio commercial farmer subscribed to more than three of the five major farm magazines.

County agent

Respondents were questioned as to their communication with their county agent during the interview. Information-seeking contacts with the county agent could be of several types: attending meetings, reading newsletters or bulletins, calling the agent on the telephone, or visiting with him on the respondent's farm. From this data, an Extension contact scale was developed which measured the amount of communication each respondent had with his county agent. (17)

Past research findings have generally indicated that more innovative farmers have the greatest degree of communication with their county agent. There is little previous evidence, however, as to whether innovators or early adopters have more Extension contact. We have already seen that there is a tendency for innovators to communicate directly with agricultural scientists, thus circumventing the county agent.

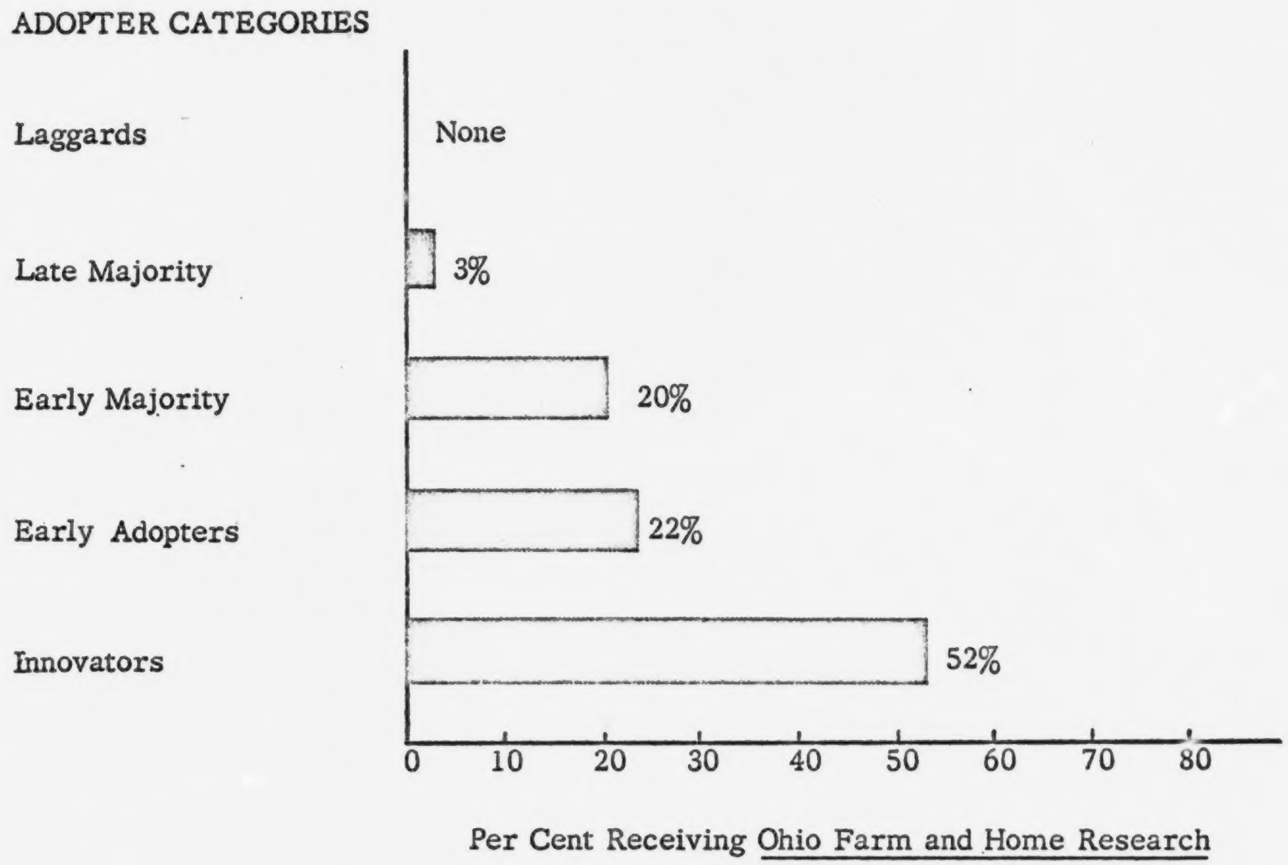

Figure 10. Per Cent Receiving Ohio Farm and Home Research by Adopter Category

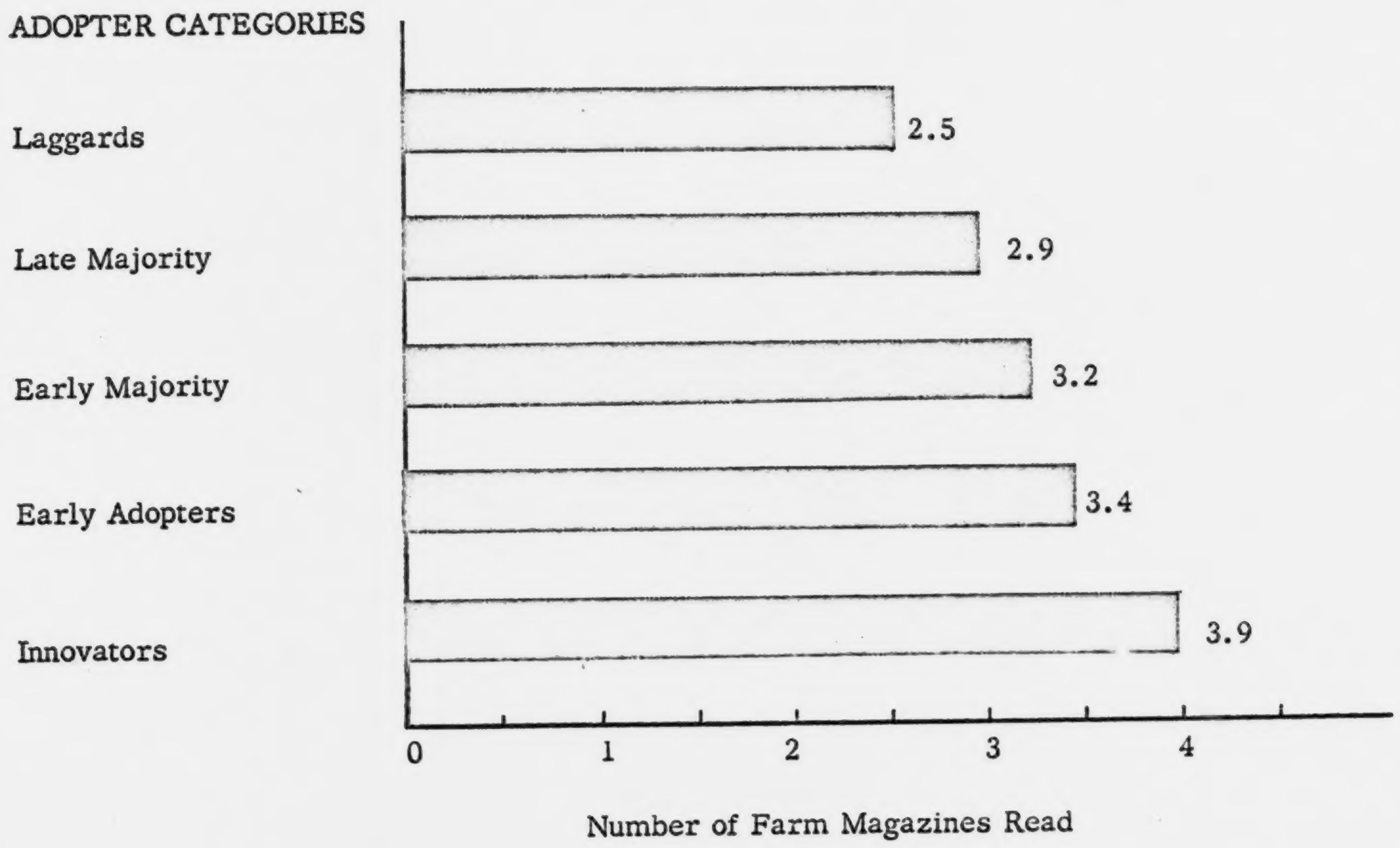

Figure 11. Average Number of Farm Magazines Read by Adopter Category

Figure 12 indicates that early adopters have a greater degree of contact with their county agent than do innovators or other adopter categories. Correlation is +.336 between innovativeness scores and Extension contact scores, which is significant at the .01 level.

The 96 respondents in the innovator sample were asked, "How much help do you receive from your county agent about new farm practices?" Analysis of the replies indicates that the *role* of the county agent may be different when he is interacting with innovators than with other adopter categories. Some innovators perceived their county agent as their most important and most reliable source of new farm information. This by no means was a majority of the innovators, however. Typical comments of these innovators were:

> "I would say I get more help from the county agent than anywhere else."

> "He is our closest adviser. I receive bulletins and get information every month or so."

A greater number of innovators indicated they viewed their county agent in a sort of "latent" role; he was available and could be called upon in case of need. But many of these farmers went on to mention that they actually make relatively little use of their county agent.

> "You can get help unlimited if you go after it, or if you make your wants known."

> "I receive all the help I ask for, but maybe I do not get to see him often enough."

> "I don't really get much help on [the county agent's] initiative, but he can always be depended upon if I go to him for advice."

Another type of response from some innovators placed the county agent in a "legitimizing" role; that is, although he was not always the source of new farm information, the county agent often was important in placing the stamp of approval upon a new idea and thus convinced some innovators to adopt.

> "The farmer usually gets the new idea from some other source, and then talks it over with the agent to see if it is practical on his own farm."

> "Anytime there is doubt in my mind about a new practice, I consult our county agent."

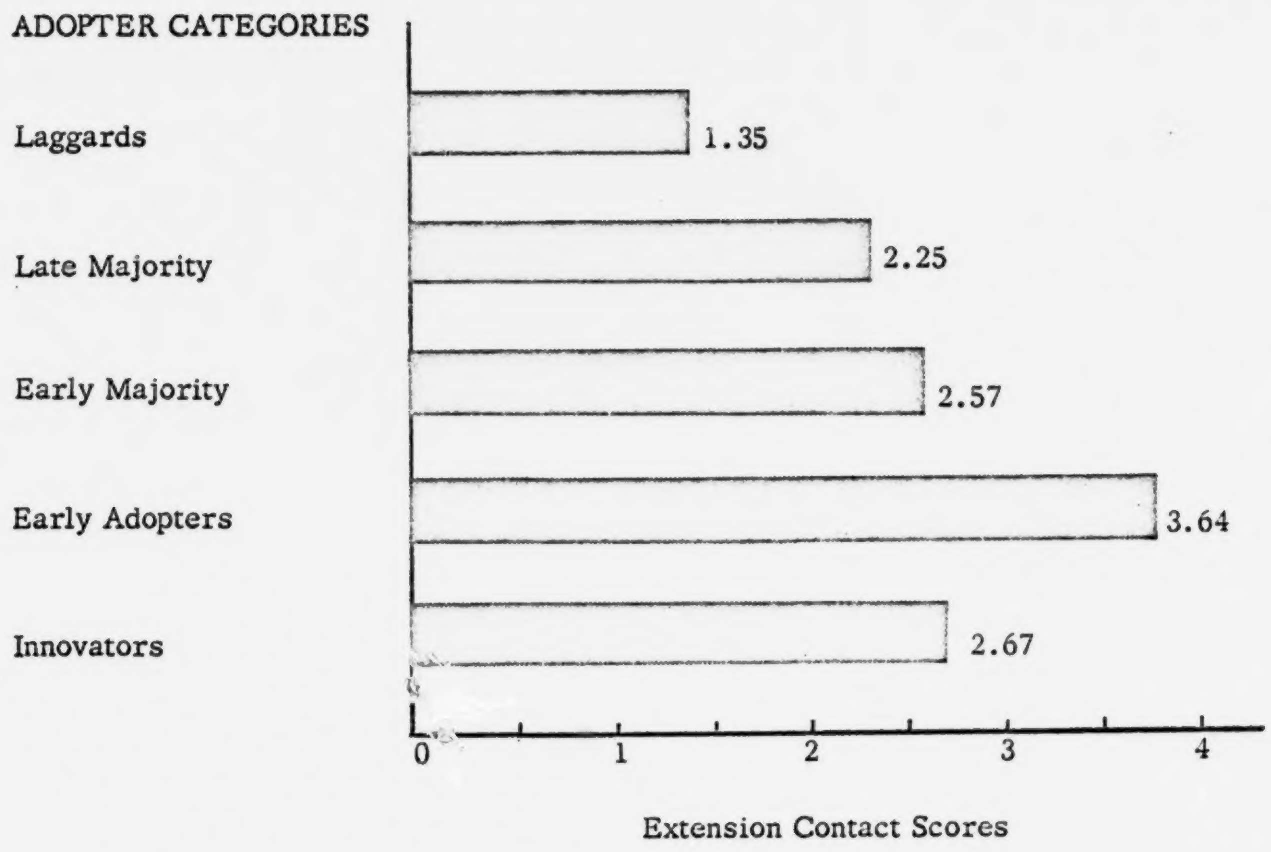

Figure 12. Average Extension Contact Scores by Adopter Category

Yet other replies seemed to indicate that some innovators tended to regard their county agent as almost an "equal" in knowledge about new practices. The average years of education possessed by innovators (over 20 per cent were college graduates) would suggest that in some respects they may correctly view themselves as equal in technical competence to their county agent. The innovators were often highly specialized in their farm enterprises. Thus, they only needed to keep abreast of new developments in one area while county agents were forced to be "generalists".

> "Commercial companies and farm magazines seem to get here first with the new ideas. The county agent isn't too much help to me."
>
> "The agent is of almost no help to me. I am a graduate of Ohio State University in Animal Science and I am more aware of current practices than [the county Extension agent] is."

Social Relationships

Opinion leadership

The "two-step flow of communication" model has already been discussed. This model states that influences stemming from the mass media first reach "opinion leaders" who then pass this information along to their friends and neighbors as personal influence. In the present study, 63 per cent of the respondents said there were one or more opinion leaders in their neighborhood. Twenty per cent of the respondents named two or more opinion leaders from which they secured agricultural information. An opinion leadership scale was constructed and administered to the respondents as part of the personal interview. This scale measured the degree to which each farmer perceived himself to be an opinion leader. The scale consisted of six items:

1. During the past six months have you told anyone about some new farming practice?

2. Compared with your circle of friends (a) are you more likely, or (b) are you less likely to be asked for advice about new farming practices?

3. Thinking back to your last discussion about some new farm practice, were you (a) asked for your opinion of the new practice or (b) did you ask someone else?

4. When you and your friends discuss new farm practices, what part do you play: (a) mainly listen, or (b) try to convince them of your ideas?

5. Which of these happens more often: (a) you tell your neighbors about some new farm practice, or (b) they tell you about a new practice?

6. Do you have the feeling that you are generally regarded by your neighbors and friends as a good source of advice about new farm practices?

These six items yielded a split-half reliability of .703. A Guttman scale analysis yielded a coefficient of reproducibility of 91.4 per cent which contributes some evidence that the scale measures a single dimension. Correlation of the opinion leadership scores with a sociometric validity check was +.367.

The crucial question to be answered is: Which adopter category do other farmers look to most for advice and information about new farm ideas? It would probably not be the laggards. In order to function as an opinion leader, a farmer must learn about new farm ideas before his neighbors. There is some evidence from previous research studies that innovators are often regarded as deviants by their neighbors because they adopt new ideas much sooner than the average farmer. Sociologists generally view opinion leaders as relatively more loyal to group norms. For example, Marsh and Coleman (18) found that in Kentucky neighborhoods with innovative norms, opinion leaders adopted new ideas much sooner than their neighbors. However, in neighborhoods with traditional norms on innovativeness, opinion leaders adopted at about an average rate.

Opinion leadership for each adopter category is shown in Figure 13.(19) Correlation is +.321 between innovativeness scores and opinion leadership scores, which is significant at the .01 level.

These data do not, however, provide evidence as to whether innovators or early adopters possess greater opinion leadership (because only three innovators were administered the opinion leadership scale). A shortened and more specific version of the opinion leadership scale was administered to both the commercial farmer sample and the innovator sample. Each respondent was asked whether he helped convince his neighbors or friends to adopt six specific new farm ideas (such as weed sprays, feeds, crop varieties, and farm equipment); the replies provide a crude measure of opinion leadership. (20) The average number of practices each respondent convinced his neighbors and friends to adopt by adopter category is shown in Figure 14. These data indicate that innovators possess the greatest degree of opinion leadership. (21) Correlation is +.378 between innovativeness and this measure of opinion leadership, which is significant at the .01 level.

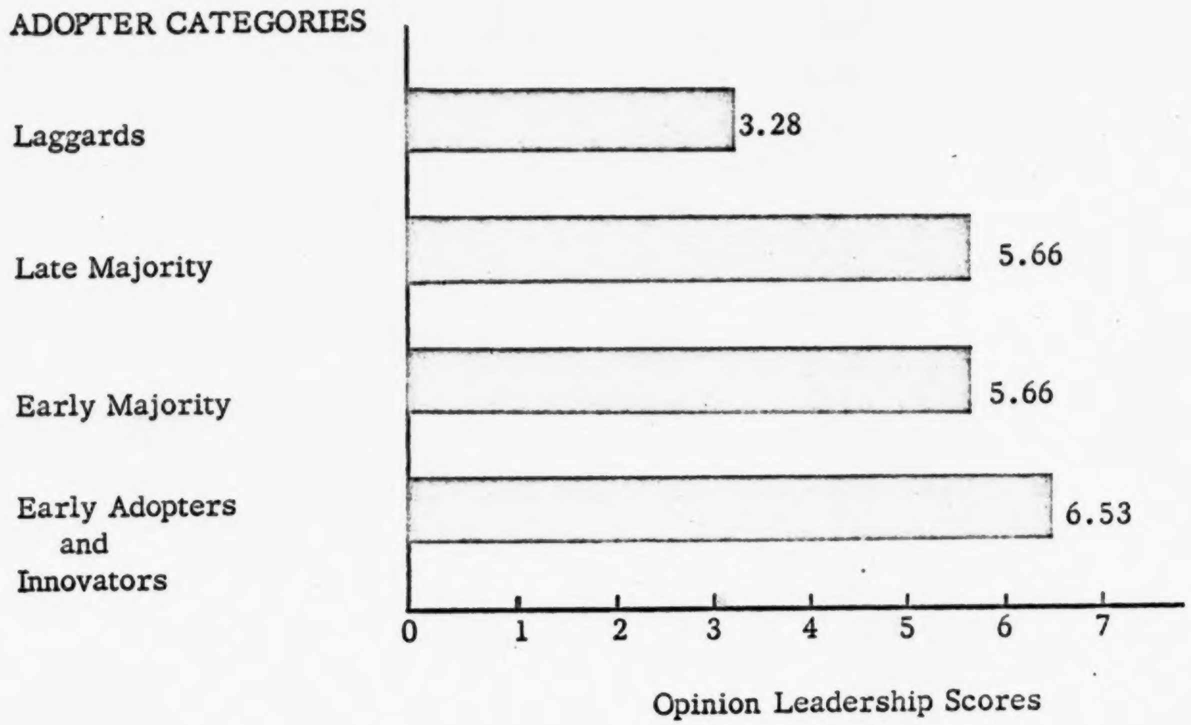

Figure 13. Average Opinion Leadership Scores by Adopter Category

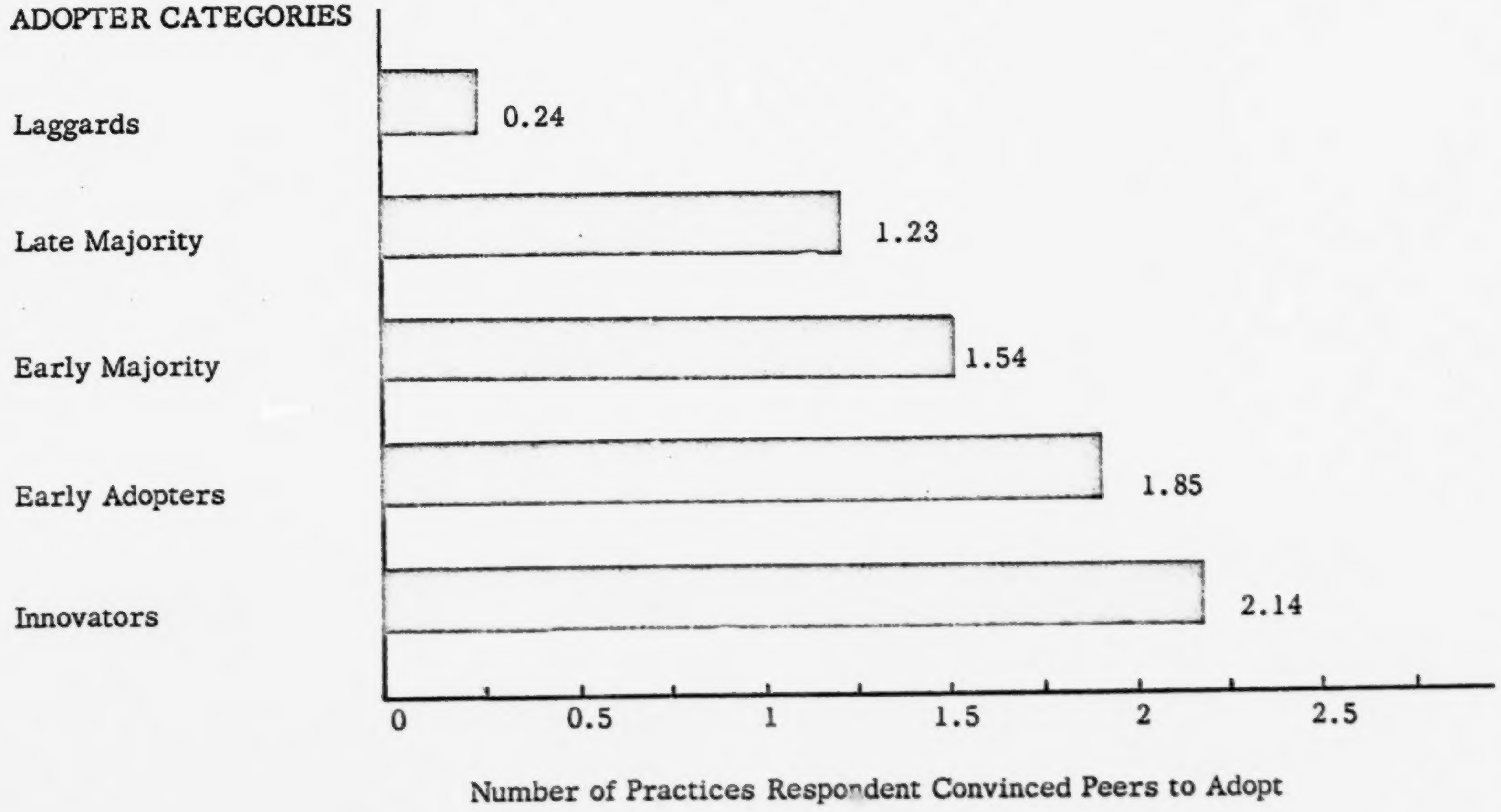

Figure 14. Average Number of Practices Respondent Convinced Peers to Adopt by Adopter Category

Cosmopoliteness

Cosmopoliteness is the degree to which an individual's orientation is external to a particular social system. A cosmopoliteness-localiteness scale was constructed; typical items in the scale were the degree to which work and equipment were exchanged with neighbors, amount of visiting with neighbors, and importance of neighbors' opinions on the respondents' farming decisions.

The original two-step flow hypothesis implied that opinion leaders secured their information mainly from the mass media. Later analyses, (22) however, have suggested that these sources of information may be either personal or mass media as long as they come from a technically competent source. Information about most new farm ideas comes from outside of the local rural community. Thus, we would expect the more innovative adopter categories to have greater cosmopoliteness in their social relationships. Innovators would be expected to travel widely to secure new farm ideas.

An innovator is different from the average farmer; as such, he does not fit smoothly into the social relationships of the local neighborhood. The present findings indicate that innovators are more cosmopolite than any other adopter category (Figure 15). Early adopters are the most localite. Correlation is +.034 between innovativeness scores and localiteness scores, which is not significant at the .05 level.

Responses of the 96 innovators indicate a wide perspective in terms of travel to learn about farm innovations. The respondents were asked, "Within the past year, have you traveled outside of your county to observe some new farm practice in operation?" Seventy-seven per cent of the innovators said they had done so. And few of these innovators had traveled only to the next county! In fact, almost half of the respondents had not only traveled outside of their county but outside of Ohio or the United States to observe new farm ideas.

> "Beef and dairy enterprises in South America, wheat practices in Canada, and new beef ideas in Colorado and Nebraska."
>
> "I visited with swine research men at the Iowa and Minnesota [Agricultural Experiment] Stations."
>
> "I was interested in dairy and beef nutrition in Michigan and potato growing automation in Pennsylvania."
>
> "Saw and discussed broiler operations and cattle feeding operations in Indiana, Illinois, and Iowa as well as Ohio this year."

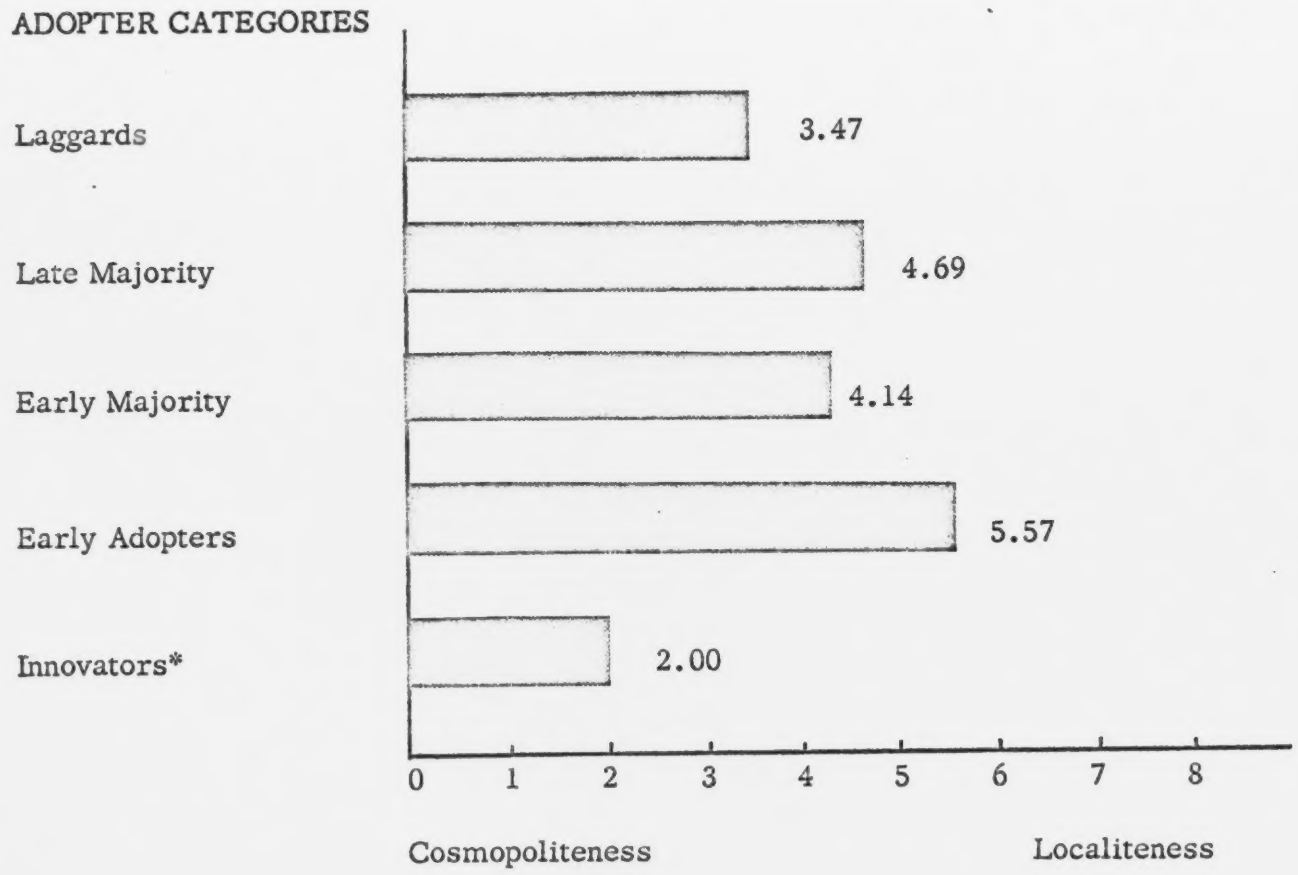

Figure 15. Localiteness Scores by Adopter Category

* Data from only the three innovators in the commercial farmer samples are included in this figure; however, the data from the other 96 respondents in the innovator sample (while not directly comparable) strongly support these findings.

Innovators not only travel widely, but they are likely to be viewed with a lack of respect from their neighbors. The 96 respondents in the innovator sample were asked, "How do your neighbor-farmers feel about many of the new farm ideas that you use on your farm?"

More than half of the responses were in terms of lack of respect from neighbors.

> "Some think that we are a little cracked."
>
> "The way I operate my farm is not the way to win popularity contests among one's neighbors."
>
> "Sometimes they shake their heads."
>
> "Fifty per cent think I am crazy, the other 50 per cent are sure I am."

Many of the remaining comments followed the general theme, "My neighbors are skeptical at first but they are convinced when the new ideas turn out successfully."

> "They [neighbors] think I spend too much [money] for new practices, but now they're all doing the same."
>
> "Some talk contempt, but they watch with interest and many of them follow."
>
> "Some are doubtful at first, but when they see a new farm idea pay out, they also try it."

The laggards exhibited less localiteness than any other adopter category except the innovators (Figure 15). Why are the laggards rejected from the neighborhood? For different reasons than in the case of the innovators. Innovators travel widely and the local reference group is of little importance to them. Laggards seldom travel outside of the community, but neither are they integrated into the neighborhood. The reason may be the inferior social status of the laggard. He cannot exchange farm equipment with his neighbors; he doesn't have the power equipment to exchange. He cannot discuss new ideas with his neighbors on an equal basis; he retreats from the competitive aspects of an "over-the-back-40-fence" discussion with his neighbors because of the threat involved in his inferior position. (23)

Summary

The purpose of the present study was to determine the characteristics of innovators and other adopter categories. Data were obtained from a random sample of 104 Ohio farmers and from a state-wide sample of 99 innovators.

Innovativeness is defined as the degree to which an individual is relatively earlierto adopt new ideas than the other members of his social system. Innovativeness was found to be negatively related to age and positively related to social status, years of education, size of farm, gross farm income, degree of farm specialization, communication with agricultural scientists, number of farm magazines read, communication with county agents, and opinion leadership. No significant relationship was found between innovativeness and cloze scores or cosmopoliteness-localiteness scores, although there was some other evidence in the latter case that innovators are more cosmopolite than other adopter categories. In the case of almost every variable related to innovativeness, there was a consistent trend in the variable from innovators to laggards.

A composite portrait

A thumbnail sketch of each adopter category is presented in this section as a summary of both the present study and some of the 503 other publications on the diffusion of innovations. (24)

1. Innovators: venturesome

A dominant value for innovators is venturesomeness. They desire the hazardous, the rash, the risky, and the avant-garde. This interest leads them out of a local circle of peers into more cosmopolite social relationships. Innovators travel in a circle of venturesomeness, like circuit riders who spread new ideas as their gospel. To be an innovator has several prerequisites. They include control of substantial financial resources to absorb the possible loss from an unprofitable idea, and the ability to understand and apply complex technical knowledge.

2. Early adopters: respect

While innovators are cosmopolites, early adopters are more localite. This adopter category, more than any other, has opinion leadership in the local social system. The early adopter is considered by his peers as "the man to check with" before using a new idea. Because early adopters are not "too far" ahead of the average farmer in innovativeness, they serve as a role-model for many other individuals. The early adopter is respected by his peers and embodies the successful and discrete use of innovations. And the early adopter knows that he must continue to earn this respect from his colleagues if his position in the social structure is to be maintained.

3. Early majority: deliberate

The early majority adopt innovations just before the average member of a social system. Early majority may deliberate for some time before completely adopting a new idea. Their adoption period (from awareness of a new idea to complete adoption) is relatively longer than the innovator's or early adopter's. "Be not the last to lay the old aside, nor the first by which the new is tried," might be the motto of the early majority.

4. Late majority: skeptical

The late majority adopt innovations just after the average member of a social system. Adoption may be both an economic necessity and the answer to increasing social pressures. New ideas are approached with a cautious air, and the late majority do not adopt until a majority of their peers favor the innovation.

5. Laggards: tradition

Laggards are the last in a social system to adopt new ideas. The point of reference for the laggards is the past. When laggards finally adopt an innovation, it may already be superseded by another more recent idea which the innovators are using. Laggards tend to be frankly suspicious of innovations, innovators, and change agents. Their advanced age and tradition-direction slows their adoption process to a crawl. Adoption lags far behind awareness of a new idea. While most individuals in a social system are looking to the road of change ahead, the laggard has his attention fixed on the rear-view mirror.

Implications for Future Research

The two-step flow hypothesis

The two-step flow of communication was a guiding hypothesis behind some parts of the present study. The two-step flow might suggest that new ideas are first communicated to and adopted by the innovators and early adopters who, in turn, diffuse the ideas to later adopters. Evidence from the present study (and from other data gathered under this research project) indicates that there is a "relay function" in the diffusion of new ideas. This relay function from agricultural scientists to farmers, however, may be multi-staged and the process is probably more complex than the two steps originally proposed. At any one point in the diffusion process, there are two steps involved in information transfer (receiving and sending). If an investigator wishes to do so, he may take a dyadic relationship as his unit of analysis.

Unsuccessful innovators

The findings in the present study are based largely on data secured from successful innovators. Because of the relatively high risks involved in innovative behavior, there may well be "unsuccessful innovators". These individuals may be difficult to locate as they may bankrupt themselves out of farming. Nevertheless, future research might well proceed in the direction of studying these unsuccessful innovators.

Most of the farm ideas included in the present innovativeness scale are Extension-recommended ideas. There occasionally appear on the farm market some new products that are not recommended and that are sometimes not successful. Would innovators also be the first to adopt these "unsuccessful practices" as well as the recommended practices? The answer to this question might provide valuable insights into the nature of innovative behavior.

Personality

There has been considerable speculation among anthropologists and other social scientists on the personality of the innovator. Barnett (25) has hypothesized that "there is a positive correlation between individualism and innovative potential." In another writing this author (26) stated, "The disgruntled, the maladjusted, the frustrated, or the incompetent are preeminently the acceptors of culture innovations and change." Adams (27) found that while Barnett's hypothesis may perhaps hold true in cases where change is rapid and violent, the innovator has high prestige where change is gradual.

The tentative findings of the present study suggest that agricultural innovators are not maladjusted, frustrated, or incompetent. In fact, the composite picture of the innovator is an elite farmer who is highly research-oriented, commercialized, specialized, and successful. There is need to administer standard personality tests to agricultural innovators. Then, their scores might be compared with established test norms or with the scores of other farmers.

Perhaps a next step in this type of research is to study innovators in industry, in education, in medicine, and in other fields. Who knows, there may even be innovators among sociologists?

REFERENCES

1. This chapter reports findings from Ohio Agricultural Experiment Station Project Hatch 166, "The Communication Process and the Adoption of Farm and Home Practices," which were originally published in greater detail as Research Bulletin 882, 1961.

2. This system of adopter classification is more fully described in Everett M. Rogers, "Categorizing the Adopters of Agricultural Practices," Rural Sociology, 23: 345-54, 1958. The classification system is based upon the finding that most adopter distributions over time closely approach normality. The normal distribution has two parameters, the mean and the standard deviation, which may be utilized to divide adopter distributions into the five categories. Of course, innovativeness is a continuous dimension. Partitioning this continuum into categories is a conceptual device. The case is similar to the continuum of social status and the categories of social classes.

3. A more adequate description of this sample may be found in Everett M. Rogers and Harold R. Capener, The County Extension Agent and His Clientele, Wooster, Ohio Agricultural Experiment Station Research Bulletin 858, 1960.

4. Everett M. Rogers and L. Edna Rogers, "A Methodological Analysis of Adoption Scales," Rural Sociology, 26: 325-36, 1961.

5. A detailed description of the selection and interviewing of these 44 county Extension agents may be found in Everett M. Rogers and R. Wwayne Yost, Communication Behavior of County Extension Agents, Wooster, Ohio Agricultural Experiment Station Research Bulletin 850.

6. There is another possible source of bias in the selection of the innovators. Only the "successful" innovators were included in the present study, as the "unsuccessful" innovators (if such exist) may have passed out of farming. The location and interrogation of these unsuccessful innovators, however, poses sampling problems beyond the scope of the present study.

7. In some cases, such as Figure 1, the innovators and early adopters are pooled due to the small number of cases when the data from the 96 respondents in the innovator sample could not be used.

8. Professor Herbert F. Lionberger in a 1950 study of social status rankings in a Missouri rural community found that interviewers' social status ratings (similar to those in the present study) correlated +.80 with the composite

social status ratings made by several community judges. This suggests that interviewers' ratings may be nearly as accurate as those of "experts" or judges.

9. Wilson L. Taylor, "'Cloze Procedure': A New Tool for Measuring Readability," Journalism Quarterly, 30: 415-33, 1953.

10. Wilson L. Taylor, "Recent Developments in the Use of 'Cloze Procedure'," Journalism Quarterly, 33: 42-48, 1956.

11. Anne W. van den Ban, Boer en Landvoorlichting: De Communicatee Over Nieuwe Landouwmethodem, Assen, Netherlands, van Gorcum, in press.

12. Everett M. Rogers and George M. Beal, "The Importance of Personal Influence in Technological Change," Social Forces, 36: 329-35, 1958.

13. Chi square between adopter category and communication with agricultural scientists is 29.57 which is significant at the .01 level.

14. Not only do innovators have more communication with scientists, but innovators are also much less likely to believe in agricultural magic (such as farming by signs of the moon and witching for water) than are laggards.

15. Chi square between adopter categories and readership of Ohio Farm and Home Research is 39.42 which is significant at the .01 level.

16. In terms of its present application, the two-step flow of communication would suggest that new ideas are first diffused to the earlier adopters in a social system, who, in turn, pass these ideas along to later adopters. Paul F. Lazarsfeld and others, The People's Choice, New York: Columbia University Press, 1948, p. 151.

17. A more detailed description of the Extension contact scale may be found in Rogers and Capener, op. cit.

18. C. Paul Marsh and A. Lee Coleman, "Farmers' Practice-Adoption Rates in Relation to Adoption Rates of 'Leaders'," Rural Sociology, 19: 180-81, 1954.

19. Unfortunately, community norms on innovativeness could not be taken into account in the present analysis.

20. Correlation between the number of new ideas respondents convinced their peers to adopt and opinion leadership scores is +.367 which is significant at the .01 level.

21. Although other research studies show that the innovativeness of opinion leaders depends, at least in part, on the group norms on innovativeness.

22. Elihu Katz, "The Two-step Flow of Communication: An Up-to-date Report on an Hypothesis," Public Opinion Quarterly, 21: 61-78, 1957.

23. Another reason that laggards score low on the localiteness scale may be because the scale measures the degree of informal social participation as well as locality orientation.

24. Which are reviewed in Everett M. Rogers, Diffusion of Innovations, New York: Free Press, 1962.

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AN ORDINAL SCALE FOR MEASURING THE ADOPTION PROCESS

ROBERT MASON

Mr. Mason, associate professor of Journalism at Oregon State University, here reports on Guttman scales used to test the current ideas of what series of activities precede adoption of a new product or practice.

AN ORDINAL SCALE FOR MEASURING THE ADOPTION PROCESS

by

Robert Mason

The adoption of technological innovations has been studied in a number of contexts. One has been the adoption of new farm practices, and a process for adoption has been postulated by rural sociologists. This process, divided into sequential stages, ranges from first hearing about a practice to its final adoption.

Wilkening (9) first suggested that the adoption of new farm practices or ideas occurred in sequential stages: 1) initial knowledge of the practice. 2) acceptance of the practice as a "good" idea, 3) acceptance of the practice on a trial basis, and 4) adoption of the practice.

In 1955, a group of Midwestern rural sociologists (6) suggested that the adoption process was composed of five stages which occurred in the following order: 1) awareness, 2) interest-information, 3) evaluation or application, 4) trial, and 5) adoption. The latest paper (1) defines these stages as follows:

1. Awareness. The individual knows of the new idea but lacks information about it.

2. Interest-information. The individual becomes interested in the idea and seeks more information about it.

3. Evaluation-application-decision. The individual makes a mental application of the new idea to his present and anticipated future situation and makes the decision either to try it or not.

4. Trial. The individual uses the new practice on a small scale to validate its workability on his own farm.

5. Adoption. The individual uses the new practice on a full scale and incorporates it into his way of farming.

Attempts to measure adoption

Beal, Rogers, and Bohlen (2) attempted to "validate" the five-stage theory by asking 148 farm respondents to name information sources for each stage of adoption. The practice was feeding antibiotics to swine. From examination of a copy of a similar schedule (7) it appears that only those who had actually adopted the practice were asked the five "validating" questions. In addition, the authors noted that the items may have forced respondents to structure an adoption process such as they had postulated. The items:

> 1. Where or from whom did you first see or hear about the use of antibiotics in hog feed?
>
> 2. After you first heard about antibiotics, where or from whom did you get additional, more detailed information about antibiotics?
>
> 3. After you had enough information to know quite a lot about antibiotics, where or from whom did you get the information that helped you decide whether or not to actually try it on your own farm?
>
> 4. After you decided to try out antibiotics on your own farm, where or from whom did you get the most information to help on how much to use, how to feed it, how to handle it, where to get it, and the kind to use on your own farm?
>
> 5. After you once tried antibiotics on your own farm, how did you decide whether or not to continue using it -- actually adopt it?

In addition, each respondent was asked to recall the dates in which he passed through each stage. After examining their data, the authors contended that "though the findings reported are not conclusivie, they seem to support the validity of the stage concept".

Copp, Sills, and Brown (4) derived adoption stage classifications from an examination of open-ended items asked a random sample of 175 Pennsylvania dairy farmers about their experiences for each of three farm practices. This design, which separated adoption items from information-use items, left classification of stage sequences to an unknown number of Pennsylvania State rural sociologists. These sociologists were able to classify case history information in the following stages: 1) awareness, 2) interest, 3) acceptance, 4) trial, and 5) adoption.

The above attempts cannot be considered satisfactory measures of the adoption process. In the Beal study, information source use has been incorporated as part of the adoption question. Hence, in order to answer what is basically an information use item, the respondent must tacitly agree that he has passed through the adoption stage mentioned. This appears to shed little light on the adoption process, since the items themselves force the respondent to structure a process of awareness ——→ interest ——→ evaluation ——→ trial ——→ adoption. How this might have affected variation in recall ability is difficult to determine.

In the Copp study, where adoption stages were inferred from responses to "guiding questions", coder reliability was not reported, if at all measurable, since the number of independent coders may have been only one.

In both cases, estimates of reliability (the extent to which repeated observations give the same reported results) and empirical validity (the extent to which an adoption measure is really of the attribute in which we are interested) are unreported, and perhaps uncalculable. In addition, the measures appear to lack objectivity, i.e. they may not be free from personal biases.

What are the necessary and sufficient conditions for an adoption process?

Five stages are not necessary to postulate an adoption process. Two stages are necessary and sufficient. These are awareness and adoption, with awareness occurring before adoption. Why the rural sociologists came up with five stages is not clear. Since only two stages are both necessary and sufficient, there is no a priori likelihood to expect that stages will occur empirically as the rural sociologists have suggested. What should occur is that awareness and adoption stages will be present, with awareness before adoption. Presence and sequence of the other stages may vary according to characteristics of the agricultural practice and the individual farmer.

Developing a measure to test the adoption process

The rural sociologists have hypothesized an adoption process that occurs over a period of time. They have postulated a process consisting of five stages which occur in the following order: 1) awareness, 2) interest-information, 3) evaluation, 4) trial, and 5) adoption. To test this hypothesis, a questionnaire survey was undertaken. As a first step, items were developed to represent each stage hypothesized. Each item was related to a specific practice, and practices were selected on the basis of availability of validating information. Dates of adoption were available from the County Agent, Agricultural Stabilization and Conservation Committee, and Soil Conservation Service. Practices selected for study were soil testing, tile drainage, joining a community drainage project, and land leveling. Soil testing is a simple, inexpensive, reversible practice. The other three are complicated, expensive, and irreversible. Some stages of the process postulated by the rural sociologists were not relevant to some of the practices selected. The trial stage, for example, did not apply to tile drainage, community drainage project, and land leveling. In addition, the practices suggested alternative specific ways farmers could obtain information rather than just generally seeking it. Items representing these other methods were added. A geographically inclusive, single-crop farming area in a central Willamette Valley county in Oregon was selected. Respondents were full-time farmers.

Since the rural sociologists hypothesized a transitive process involving temporal stages, an analytical procedure which yields a measure of unidimensionality was employed. Scalogram analysis, described by Guttman, (8) was the procedure used. If each sequential stage of adoption is to be regarded as a necessary condition for the next stage to occur, then a scaling analysis ought to provide an empirical check on this sequence. Is it necessary for awareness to precede interest-information? For interest-information to precede evaluation? A scalogram analysis should provide an answer to this type of question.

In addition, a reliability coefficient is calculable. And from independent data, an estimate of adoption validity is calculable. That is, one can calculate a validity estimate of whether or not an individual actually adopted a practice when a scale score indicates he has adopted it.

Selection of specific scale items. Each item consisted of four ordinal response alternatives and incorporated a single adoption "stage" and a single practice. The battery of items for adoption of soil testing, for example, was:

1. How much have you heard about any value of having your soil tested -- nothing, a little, quite a bit, or a lot?

2. How interested have you been in having your soil tested -- not at all interested, not too interested, quite interested, or very interested?

3. How much information have you obtained about having your soil tested -- a lot, quite a bit, a little, or none at all?

4. How often have you discussed testing of your soil with others -- never, not too often, quite often, or very often?

5. How often have you had a small patch of your soil tested -- never, not too often, quite often, or very often?

6. How seriously have you considered having your soil tested -- very seriously, quite seriously, not too seriously, or not at all seriously?

7. How often have you had your soil tested -- very often, quite often, not too often, or never?

In terms of stages postulated by the rural sociologists, the above items would represent the following: 1) awareness, 2) interest-information, 3) interest-information, 4) interest information, 5) trial, 6) evaluation, and 7) adoption.

Similar items were developed for each practice. An adoption item was not used for the community drainage project scale. We were unable to determine a continuum upon which to base scalar alternatives for an adoption item. It appears that a farmer either joined or did not join a project or a "pool", and such agreements usually included all or most of his land. In retrospect, a dichotomous adoption item should have been included, so one could have calculated a validity estimate if the item had survived the scaling operation.

There was a problem of item order. Pretesting indicated that randomizing was not satisfactory, particularly when the awareness item came late or the adoption item early in the order. A solution, also pretested, was to always ask the awareness item first and the adoption item last. This meant item order effects could be present. Practices were paired in an effort to reduce those order effects that were correlated with practice. After two items about land leveling, for example, the awareness item for soil testing was asked, followed by a single land leveling item, then two soil testing items, etc. At the same time, order of response alternatives was randomly reversed.

Data collection procedures. An independent commercial firm was hired to conduct the interviewing. All interviewers were housewives. A total of 159 full-time farmers were interviewed -- 81 per cent of those available. Of the remainder, 7 per cent were refusals, the rest not-at-homes. Both mail and telephone verification checks of about 35 per cent of those contacted disclosed no irregularities in interviewing. Sponsorship was not disclosed to respondents or to interviewers.

Scaling method. The computational scaling routine outlined by Brinton, Bush and Newell (3) was followed. The identity of scale items, however, was not known until after the scaling was completed. Only column numbers on IBM cards were used to keep track of items.

Results

Scalogram analysis was employed to test the unidimensional sequencing of the adoption stages. The scaling order of stages would demonstrate that those with higher scores would have completed more stages than those with lower scores. The scale order of items also would indicate the sequence in which stages were used. Thus, the adoption process hypothesized by the rural sociologists is established if the soil test items, for example, occur in a scale order of 1) awareness (hearing), 2) interest-information (interest, seek information, discuss with others), 3) evaluation (seriously consider), 4) trial, and 5) adoption.

The interest-information items could occur in any order, so long as they all occurred between awareness and evaluation.

Tables 1 to 4 give the results of the scaling analysis. From these results, one can answer four questions regarding stages in the adoption process: 1) Is awareness before adoption? 2) How many of the five stages the rural sociologists postulated fit in a unidimensional sequence? 3) What sequences do the interest-information seeking and evaluation stages take? 4) Is the adoption stage last in scale item order?

1. Awareness occurred before adoption for soil testing, tile drainage, and joining a community drainage project. But for land leveling, adoption occurred before awareness. It seems impossible that one can adopt any practice without first hearing about it. One possible explanation is the method used for selecting item cutting points in the scalogram analysis. The item, and thus the stage, was unknown during the scaling operation. Each item was assigned a number and only this identification was used during the scaling. In this way, item cutting points were made only on the basis of minimum errors and equal distribution of marginals. Selection of a different cutting point for the adoption item would have led to different placement in the scale order -- but with a lower coefficient of reproducibility. Another possible explanation is the response farmers could have given to the awareness item. The question asked them was, "How much have you heard about any value of having your land leveled for drainage with a 40-50 foot land plane -- a lot, quite a bit, a little, or not at all?" The word "heard" could have been responded to literally referring only to audition, and visual awareness of the practice could have occurred without being mentioned. The "hearing" item could be combined with the other information items. The cutting point for this composite item would have had to have a greater proportion of positive responses. In this fashion, the necessary and sufficient condition for an adoption process would have been met; that is, an awareness stage occurring prior to adoption.

2. These items had to be dropped in the scale analysis:

Practice	Stage	Item
Soil Testing	Trial	"tried on a small scale"
Tile Drainage	Interest-information	"observed effects on a neighbor's land"
Joining a Community Drainage Project	Interest-information	"discussed with others"
Land Leveling	Interest-information	"watched someone else's land being leveled"

Table 1. Scalogram of Soil Test Items

Scale Score	ITEMS						Number of Cases	Errors
	Discuss w/Others	Seek Info.	Interest	Adopt	Seriously Consider	Heard		
6	1	1	1	1	1	1	24	0
5	0	1	1	1	1	1	17	0
5	1	1	0	1	1	1	1	1
5	1	0	1	1	1	1	1	1
5	1	1	1	0	1	1	1	1
4	0	0	1	1	1	1	9	0
4	0	1	0	1	1	1	3	3
4	1	0	0	1	1	1	3	3
4	1	0	1	0	1	1	1	2
4	1	1	0	0	1	1	1	2
3	0	0	0	1	1	1	28	0
3	0	0	1	0	1	1	4	4
3	0	1	0	0	1	1	1	1
3	1	0	0	0	1	1	1	1
2	0	0	0	0	1	1	13	0
2	0	0	0	1	1	0	4	4
2	0	0	0	1	0	1	4	4
2	0	1	0	0	0	1	1	1
1	0	0	0	0	0	1	15	0
1	0	0	0	1	0	0	2	2
1	0	0	0	0	1	0	2	2
0	0	0	0	0	0	0	23	0
Total							159	32
Positive Responses	33	50	57	96	114	128		

Coefficient of Reproducibility: $\frac{954 - 32}{954} = .967$

Coefficient of Scalability (by individuals): $\frac{239 - 32}{239} = .866$

Coefficient of Scalability (by items): $\frac{279 - 32}{279} = .885$

Table 2. Scalogram for Tile Drainage Items

Scale Score	ITEMS						Number of Cases	Errors
	Interest	Adopt	Seek Info.	Seriously Consider	Discuss w/Others	Heard		
6	1	1	1	1	1	1	16	0
5	0	1	1	1	1	1	10	0
5	1	0	1	1	1	1	6	6
5	1	1	0	1	1	1	1	1
5	1	1	1	1	0	1	2	2
4	0	0	1	1	1	1	8	0
4	0	1	0	1	1	1	2	2
4	0	1	1	1	0	1	3	3
4	1	0	0	1	1	1	1	1
4	1	0	1	0	1	1	2	4
3	0	0	0	1	1	1	5	0
3	0	0	1	0	1	1	5	5
3	0	0	1	1	0	1	1	1
3	0	1	0	1	0	1	2	4
3	0	1	0	0	1	1	1	1
3	0	0	1	1	1	0	1	1
2	0	0	0	0	1	1	7	0
2	0	1	0	0	0	1	6	6
2	0	0	0	1	0	1	4	4
2	0	0	1	0	0	1	3	3
1	0	0	0	0	0	1	43	0
1	0	0	0	0	1	0	2	2
0	0	0	0	0	0	0	28	0
Total							159	46
Positive Responses	28	43	57	62	67	128		

Coefficient of Reproducibility: $\frac{954 - 46}{954} = .952$

Coefficient of Scalability (by individuals): $\frac{181 - 46}{181} = .745$

Coefficient of Scalability (by items): $\frac{288 - 46}{288} = .841$

Table 3. Scalogram for Community Drainage Project Items

Scale Score	ITEMS						Number of Cases	Errors
	Seek Info.	Interest	Seriously Consider	Would Help	Observed	Heard		
6	1	1	1	1	1	1	20	0
5	0	1	1	1	1	1	5	0
5	1	0	1	1	1	1	1	1
5	1	1	1	0	1	1	2	2
5	1	1	1	1	0	1	1	1
4	0	0	1	1	1	1	4	0
4	0	1	1	0	1	1	1	1
4	0	1	1	1	0	1	2	2
4	0	1	1	1	1	0	2	2
4	1	0	0	1	1	1	1	1
3	0	0	0	1	1	1	10	0
3	0	0	1	0	1	1	2	2
3	0	0	1	1	0	1	1	1
2	0	0	0	0	1	1	24	0
2	0	0	0	1	0	1	2	2
2	0	0	1	0	1	0	1	2
2	0	0	0	1	1	0	2	2
2	0	0	1	0	1	0	2	4
2	0	0	1	0	0	1	1	1
1	0	0	0	0	0	1	24	0
1	0	0	0	1	0	0	7	7
1	0	0	1	0	0	0	1	1
1	0	0	0	0	1	0	7	7
0	0	0	0	0	0	0	36	0
Total							159	39
Positive Responses	25	33	46	58	84	101		

Coefficient of Reproducibility: $\frac{954 - 39}{954} = .959$

Coefficient of Scalability (by individuals): $\frac{171 - 39}{171} = .772$

Coefficient of Scalability (by items): $\frac{295 - 39}{295} = .868$

Table 4. Scalogram for Land Leveling Items

Scale Score	ITEMS						Number of Cases	Errors
	Interest	Seek Info.	Seriously Consider	Heard	Discuss w/Others	Adopt		
6	1	1	1	1	1	1	19	0
5	0	1	1	1	1	1	4	0
5	1	0	1	1	1	1	2	2
5	1	1	1	0	1	1	2	2
5	1	1	1	1	1	0	1	1
4	0	0	1	1	1	1	4	0
4	0	1	0	1	1	1	3	3
4	1	0	1	1	0	1	1	2
4	0	1	1	0	1	1	2	2
4	1	1	1	0	0	1	1	2
4	1	0	1	1	1	0	1	2
4	0	1	1	1	1	0	1	1
3	0	0	0	1	1	1	11	0
3	0	0	1	1	1	0	2	2
3	0	0	1	1	0	1	1	1
3	0	1	0	1	1	0	1	2
3	0	0	1	0	1	1	1	1
2	0	0	0	0	1	1	21	0
2	0	0	0	1	0	1	8	8
2	0	1	0	0	1	0	2	4
2	0	0	1	0	1	0	1	2
1	0	0	0	0	0	1	15	0
1	0	0	0	0	1	0	14	14
1	0	0	0	1	0	0	6	6
1	0	0	1	0	0	0	2	2
0	0	0	0	0	0	0	33	0
Total							159	59
Positive Responses	27	36	45	65	92	95		

Coefficient of Reproducibility: $\frac{954 - 59}{954} = .938$

Coefficient of Scalability (by individuals): $\frac{184 - 59}{184} = .674$

Coefficient of Scalability (by items): $\frac{304 - 59}{304} = .806$

The items did not meet criteria for scalability. They failed to afford a distinct cutting point among response categories and/or had more error than non-error among positive responses.

The trial item -- the one time it was used -- did not meet the requirements of a unidimensional sequence member. Thus there is reason to suspect that the trial stage is not a necessary stage in an adoption process.

The other items dropped were added to the set by the author, and do not furnish evidence for or against the process theory of the rural sociologists. Other interest-information seeking items did meet scale criteria.

3. In each of the four scales, the item representing the evaluation stage occurs before the items representing interest-information seeking. This is contradictory to the process theory which places evaluation after interest-information seeking.

Since interest-information seeking is represented by two items, it is conceivable that a composite of the two items would fall before the evaluation item in the scales. This would happen if the two items were uncorrelated alternative behaviors, each sufficient to represent the stage. But examination of the results in Tables 1 to 4 shows that a composite of the two items would not change the order found. The items are very highly correlated. Respectively, positive responses for a composite item would increase only 7, 2, 2, and 4 beyond those for the more frequent of the two items. This would not place interest-information seeking before evaluation.

4. The evidence suggests that adoption is not the terminal stage. Interest-information seeking items appear after adoption for each practice studied. For the practice of land leveling, evaluation also occurs after adoption.

It would seem that there is no single adoption process for all practices. Neither is there any evidence here that for any one practice the formulation of the rural sociologists can be supported.

Adoption scale reliability. Spearman-Brown split-half (odd-even) reliability estimates for the four adoption scales were: soil test, .945; tile drainage, .943; joining a community drainage project, .924; and land leveling, .874.

Validity of adoption scale scores. Dates of adoption for soil testing were secured from the local county extension agent. Dates of installation of tile lines were secured from the local Agricultural Stabilization and Conservation (ASC) office. Dates of completion of land leveling were secured from both the local ASC and Soil Conservation Service (SCS) district office. Dates of joining a community drainage project were obtained from the SCS district office.

Adoption scale scores were dichotomized into adopters and non-adopters, as were the data from the county agent, ASC, and SCS offices.

Results were as follows:

Table 5. Validity of Soil Test Adoption Scale Scores

County Agent	Scale Score Not Adopt	 Adopt	 Total
	%	%	%
Adopt	8.1	91.9	100 (62)
Not Adopt	60.8	39.2	100 (97)

$X^2 = 43.964$ with 1 d.f., $\underline{P} < .001$
$\overline{C} = .730$

Table 6. Validity of Tile Drainage Adoption Scale Scores

ASC	Scale Score Not Adopt	 Adopt	 Total
	%	%	%
Adopt	31.6	68.4	100 (19)
Not Adopt	84.3	15.7	100 (140)

$X^2 = 26.889$ with 1 d.f., $\underline{P} < .001$
$\overline{C} = .597$

Table 7. Validity of Land Leveling Adoption Scale Scores

ASC, SCS	Scale Score Not Adopt	 Adopt	 Total
	%	%	%
Adopt	7.1	92.9	100 (28)
Not Adopt	23.7	76.3	100 (131)

$X^2 = 3.809$ with 1 d.f., $P < .10$
$\overline{C} = .240$

Table 5 indicates a validity coefficient, $\overline{C}$ of .73 between the adoption scale score and the county agent report of actual soil test adoption. This $\overline{C}$ is significantly greater than zero at the .001 level. Table 6 indicates a validity coefficient, $\overline{C}$, of .597 between the adoption scale score and the ASC report of actual tile drainage adoption. This $\overline{C}$ is significantly greater than zero at the .001 level. Table 7 indicates a validity coefficient, $\overline{C}$, of .24 between the adoption scale score and the ASC and SCS reports of actual land leveling adoption. This $\overline{C}$ is not significant at the .05 level.

An estimate of adoption validity for joining an ACP pool was not calculated because an adoption item was not included in the original battery of items. All one can determine is the relative location in the scale order of those who had signed pooling agreements:

Table 8. Distribution of Adopters and Non-Adopters
by Community Drainage Project Scale Scores

	Adoption Scale Score							
SCS	0	1	2	3	4	5	6	Total
	%	%	%	%	%	%	%	%
Adopt	9.1	18.2	9.1	9.1	9.1	9.1	36.4	100 (22)
Not Adopt	24.8	25.5	21.9	8.0	5.8	5.1	8.7	100 (137)

X^2 - 12.430 with 6 d.f., $P < .01$

Those who had adopted tended to have completed more stages in the adoption process.

Discussion

Awareness occurs before adoption. This is true in three of the four practices studied. Several explanations were given for the case in which adoption occurred first. Thus, the necessary and sufficient conditions for an adoption process appear to have been met.

Scale criteria. Such criteria for items derived from the stages hypothesized by the rural sociologists were met in all but one case. This was the trial stage for the soil test practice. (A trial item was not included for the other practices.) Interest-information seeking items were dropped from the scales for the other three practices, but these were items not suggested by the rural sociologists. These were suggested by the characteristics of the agricultural practices tested and were added by the author. The dropping of the trial item suggests that trial is not always part of the adoption process. If a farmer uses soil testing on a small scale it does not suggest he is involved in a process which leads to adoption.

Item sequence. The observed sequences do not occur in the order postulated by the rural sociologists. The interest-information item follows evaluation in stage sequence. The data suggest that adoption may not always be the terminal item, but that other patterns can occur in the process besides the one postulated by the rural sociologists.

With a reversible, inexpensive practice such as soil testing, some farmers adopted without the inclusion of several interest-information seeking stages. But farmers who showed interest, sought information, and discussed soil testing with others also had adopted. With an irreversible, expensive practice such as tile drainage, adoption occurred with awareness, evaluation, and interest-information seeking, but these stages also occurred without adoption.

The adoption process proposed by the rural sociologists is not derived from any of the theories of attitude formation and change. Evidence of variation in adoption patterns suggests that such theories may be useful in deriving postulates to account for variation in the number of stages in the process as well as the temporal order of stages. One theory in social psychology, for example, suggests that some information seeking follows the decision to adopt or not to adopt. Dissonance theory, as developed by Festinger, (5) states that the presence of discrepant cognitions may lead to seeking new information which will provide cognitions consonant with existing cognitive elements, but may lead also to avoiding those sources of new information which would be likely to increase existing dissonance. Two cognitive elements are defined as being in a dissonant relation if, considering these two elements alone, the obverse of one element follows from the other. Thus, dissonance almost always exists after a decision has been made between two or more alternatives. The cognitive elements corresponding to positive characteristics of the chosen alternative are dissonant with the knowledge of the action which has been taken. Thus, one cannot necessarily assume that adoption always terminates the process. At best, one might postulate that awareness is the first stage of the process, but from then on a number of covert-overt action patterns are possible. Some stages might appear more than once in the process. Information seeking, for example, might occur early in the process primarily for one to acquire information and again after decision or adoption in order to reduce dissonance.

Summary and conclusions

The necessary and sufficient condition for an adoption process is that awareness must occur before adoption. This condition has been met for the adoption of four agricultural practices among a sample of 159 Oregon grass seed growers. The awareness stage occurs before adoption in three of the four practices. The fourth could have been substantiated by using a composite item (taking "heard" and "discuss" as alternative means for awareness). This would have altered the order.

The trial item would not fit into a unidimensional sequence the only time that trial was used as a stage in the process.

Stages did not appear in the sequence postulated by the rural sociologists. Evaluation always occurred before interest-information seeking. Adoption was never the terminal item. It would seem that more than one adoption process is to be found, varying according to practice and the individual farmer.

The sequence of stages found in the adoption process suggests that information is sought at different times from different sources -- and for different reasons. Information is sought both before and after adoption. One might profitably distinguish the types of information seeking that occur. Before adoption, the individual is likely to be making instrumental communicatory responses. That is, he seeks information that tells him how to implement a new practice or idea. After adoption, the individual is likely to be making consummatory communicatory responses. He seeks information that gives him support for the new practice he has adopted, information that may reduce dissonance which arises from the fact that he has adopted the practice.

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SHANNON'S INFORMATION THEORY:
The Spread of an Idea

Randall L. Dahling

Mr. Dahling, who is now assistant editor of the Western Fruit Grower *in San Francisco, traces the diffusion of information theory through the scholarly journals of a number of disciplines, and draws some conclusions as to how an important new idea of this kind spreads.*

SHANNON'S INFORMATION THEORY: THE SPREAD OF AN IDEA

by

Randall L. Dahling

The Problem

The purpose of this study was to find out something about how scientific ideas come into use and the way in which they spread. Because of its recency, its impact, and its rapid and broad expansion, *the mathematical theory of communication* was the scientific idea selected for this study. This theory was published in 1948 by Dr. Claude E. Shannon of the Bell System Laboratories and has since become known as either *communication or information theory.*

Dr. Shannon first set forth his theory in two articles which appeared in the *Bell System Technical Journal* in July and October of 1948. Here, he set down a unified theory of signal transmission based on the concept that transmitted information may be considered statistically and its probabilities figured. This idea, of course, traces back to Ralph Hartley's discussion of the transmission of information at the International Congress of Telegraphy and Telephony in 1927 and Norbert Wiener's work in a secret World War II document. The most valuable thing about the new theory was that it provided communication engineers with an accurate and long-needed tool with which to determine the capacity of a communication channel.

The importance of the idea was instantly perceived. Other scientists started discussing it immediately, and, within a few months following its publication, new articles making use of the theory began to appear at an ever-increasing rate. At first, these new articles were restricted to communication engineering, but by November, 1949, the theory had been applied to psychology. (18) Then, in August, 1950, Jacobson applied the theory to physiology and later extended it to optics. (33, 54) By November of 1950, the theory had established itself in physics, (38) and in the same month was carried to linguistics. (40) In December of the same year it was written about from biological and sociological viewpoints. (41) By 1951 it was being discussed in statistical journals, (42) and still it continued to spread rapidly. In 1955, the theory was carried as far as the field of journalism. (130) Thus, the spread of this idea can be said to be truly phenomenal.

To determine the nature and extent of this spread, the author systematically compiled a bibliography of books, scholarly and popular articles, and newspaper stories pertaining to communication theory. This was begun by examining five books with extensive bibliographies on the subject, and by following the idea through articles in six journals selected for their identification with the subject in different disciplines. These were: the Bell System Technical Journal, Electrical Engineering, Journal of the American Statistical Association, American Psychologist, American Sociological Review, and the Journalism Quarterly. All references made by these books and articles were then followed up insofar as possible. Newspaper articles dealing with communication theory were searched out of the New York Times, with the view that this newspaper would give coverage to the idea, if any newspaper would. All popular magazine articles pertaining to communication theory were searched out through the Readers' Guide to Periodical Literature.

The bibliography which resulted from this study is on file at the Stanford Institute for Communication Research, along with a tabulation of references made to and by the various publications. This bibliography is really a table of relationships among publications on communication theory. It traces the development of the theory and shows the interaction which took place between publications during this development. Reference to this bibliography will show when an article was published, what preceded it, what followed it, what it drew upon in its application of the theory, and how it was subsequently drawn upon. This bibliography certainly does not contain all the work pertaining to communication theory, but it does at least represent the most important work to mid-1956, and all or nearly all the publications during the first few years of the new theory.

Appearance of the Idea

It should first be pointed out that the idea of information theory was by no means of independent origin. It was not individual or spontaneous, but, on the contrary, was closely related to work current with and prior to its time. All this previous work represented an attempt to solve the need for more economy in communication.

Colin Cherry, in a history of information theory, (66) traces the same basic need for efficiency in communication as far back as 63 B.C. when the freed slave Tyro invented shorthand to record the speeches of Cicero. More recently Samuel Morse developed his telegraphic code in order to use his new invention as efficiently as possible. In so doing, he utilized a statistical concept of communication by designing his code so that the most frequently used letters in the alphabet had the shortest symbols. From this point on, we see telegraphy, and later telephony and television, playing an important role in the development of a theory of communication by placing ever-greater emphasis on efficiency of transmission.

Cherry has recorded some high points in this drive for more efficient communication. He states that in 1924 "Nyquist in the United States and Küpfmuller in Germany simultaneously stated the law that, in order to transmit telegraph signals at a certain rate, a definite band width is required, a law expressed more generally by Hartley . . . [who in 1928] defined information as the successive selection of symbols and words . . . [and] showed that in order to transmit a given 'quantity of information' a definite product, band width x time, is required."(66, p. 386)

In 1946, Gabor, focusing his attention on the "concept of uncertainty", developed a theory of signal structure. This work, like the work of Wiener and Shannon, was but a logical extension of Hartley's early theory of communication.

Dr. Norbert Wiener, first in his work for the government during World War II and later in his book Cybernetics, (1) began to treat information as a statistical concept. And then came Shannon who eventually drew on all this previous work, precisely formulated a mathematical theory of communication, and thereby created the useful measure of information now so widely used.

Wiener, however, is hard to separate from the development of this idea, not only because he recognized that information could be treated as a statistical concept, but also because he pointed out that the methods to be derived from such a concept were applicable to many of the more mathematical sciences. He thereby suggested the general interest of science in communication and became instrumental in the development of such interest as began to appear through the application of Shannon's formula. As Francis Bello has put it, to "Norbert Wiener goes the major credit for discovering the new continent and grasping its dimensions; to Claude Shannon of Bell Laboratories goes the credit for mapping the new territory in detail and charting some breath-taking peaks." (146, p. 137)

It has, therefore, been necessary to give attention to references made to Wiener as well as those made to Shannon in the spread of this idea.

The foregoing considerations seem to warrant two assumptions. First, that the idea was drawn from a flurry of current related activity, and, as the idea developed, it gained impetus and speed of adoption from the same surrounding activity that gave rise to it. Second, that the adoption of the theory was speeded by a clearly apparent need for such a theory.

Support for these assumptions comes primarily from a consideration of the theory's historical setting. The need for economy in communication, which had so long been sought after, became even more pressing with the advent of World War II. After the war, the demands of both modern warfare and modern business stressed the need for better communication, greater automation, and high-speed computing machinery. In the late 1940's the need for such developments became acute. Shannon's work pointed the way and made possible the solution of these problems. His mathematical theory speeded the automatic mechanisms which were so badly needed to meet the demands created by the ever-increasing complexity of our society. Shannon, in his work for Bell Laboratories, was well acquainted with the problems as they existed at the time, especially as they related to telephony. He was naturally familiar with the work being done in an attempt to solve these problems. The fact that his idea drew upon current activity is exactly what would be expected. The rapid adoption of the theory was likewise aided by the same surrounding activity that gave rise to it. In other words, application of Shannon's theory was stimulated by the immediate need for it arising from problems of communication, automation, and computation.

The rapid adoption of the theory, which is evidenced by technical reports on it appearing only months after its original publication, (7 and 8) can only be accounted for by this clear and pressing need for the theory. The rapid development of automatic mechanisms (the most significant being the electronic computers) and their widespread use since the development of the theory give palpable support to the contention that the inception as well as the adoption of the theory was dependent upon the need for such mechanisms and that the speed of its adoption was related to the intensity of that need.

Development in the Original Discipline

In the discipline in which it originated -- i. e. communication engineering -- communication theory was rapidly picked up. Within one month after publication of the original article came another article in November, 1948, in which Shannon himself joined with two others to utilize the theory in outlining the advantages of pulse code modulation and to distinguish between pulse code modulation and other broadband systems. (5) The idea continued to develop in the field of communication engineering for a full year before it was picked up by other disciplines. During this period, five other important publications on communication theory appeared. One of these was the publication in book form of Shannon's original article along with a more popular piece by Warren Weaver describing recent contributions to communication theory. (9) In the first four years following publication, this book had a world-wide circulation of around 6,000 copies. Then, in January, 1949, Shannon followed up his previous work with a paper in which he developed a method for representing communications systems geometrically. (11) This was followed in March, 1949, by a technical report in which Fano further developed the basic theorems of communication theory while seeking an optimal coding scheme. (7) In May, 1949, Tuller published an article in which he utilized the theory in order to develop his own theory on the effects of noise. (14) Also, in 1949, Laemmel reviewed the theory and extended it for engineering applications. (8) Finally, the first symposium on communication theory was held by electrical engineers in London, and the proceedings, which were published in 1950, discussed application of the theory at length. (21)

Aside from the basis of need, there are two other apparent explanations why the idea spread so rapidly in communication engineering. The first is that *the original discipline readily picked up the idea because the source of the idea was highly credible.* That is to say, Shannon, an eminent engineer and mathematician, and the *Bell System Technical Journal*, a highly regarded scientific publication, were sources of information which other scientists respected and accepted with confidence. Any theory advanced by this source would be all the more readily considered and adopted by those familiar with the source.

Perhaps a more obvious explanation that can be advanced here, and one to which more attention will be given later, is that *the original discipline quickly picked up the idea because the vocabulary and viewpoint presented no barrier in that field.* Here, the theory was being utilized in work which dealt exclusively with mathematics and electronics, and it could be more easily applied in this natural environment than it could in fields which were not directly concerned with this sort of application, or those less accustomed to dealing with mathematics. Hence, the theory was utilized more readily where it could be adopted without having to be adapted.

Spread of the Idea to Other Disciplines

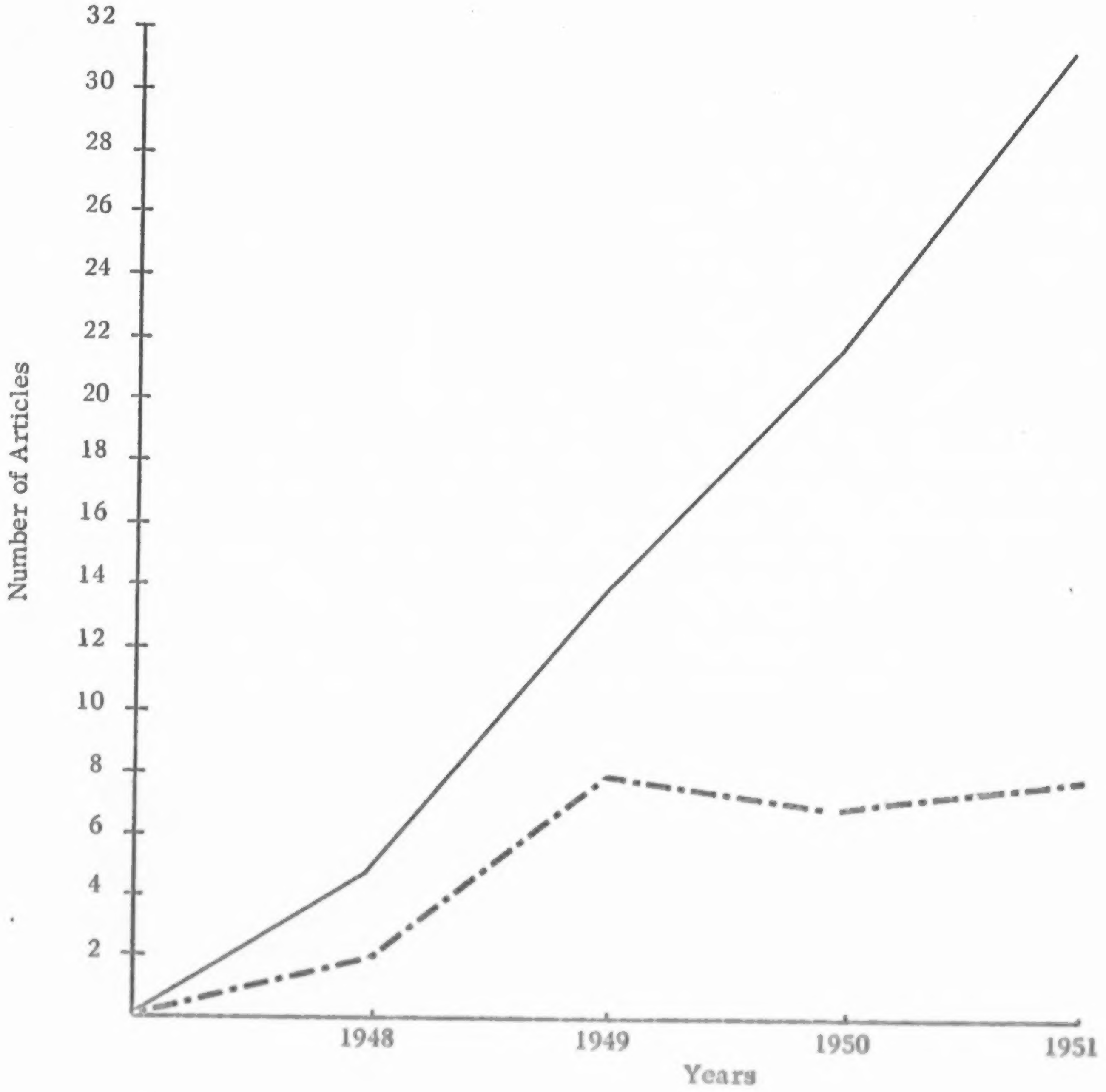
The rapid expansion of the theory should be noted. This is shown graphically in Chart 1 where two curves have been plotted to demonstrate the increased application of the theory over the years. A comparison of the curve representing all work pertaining to communication theory with the curve restricted to engineering applications reveals just how rapid and dramatic was the adoption of the idea by other disciplines.

In Chart 2, as in the ones following it, Shannon and Wiener were taken as the two major sources of communication theory. Then, by plotting the chronological development of certain selected articles and by using connecting lines to represent references made by them to earlier articles, a graphic illustration was obtained which represents a kind of "family tree" and shows the relationships which exist among various publications on communication theory. In this particular chart, the first article in each discipline having adopted the theory was used. In addition to the rapid and complex development of the idea, the chart shows that Shannon and Wiener were about equally drawn upon in the over-all application of the theory to the various disciplines. It should be noted that although the references solely to Shannon and Wiener tend to decrease slightly with time and application, the fact that they still predominate seems to be conclusive evidence of the powerful influence of the work of these two men.

As has already been pointed out, it was more than a year before any other discipline picked up the theory. Although Warren McCulloch made some application of Wiener's concept of communication to psychiatry, (15) the next discipline really to utilize communication theory was psychology. This came about

CHART 1

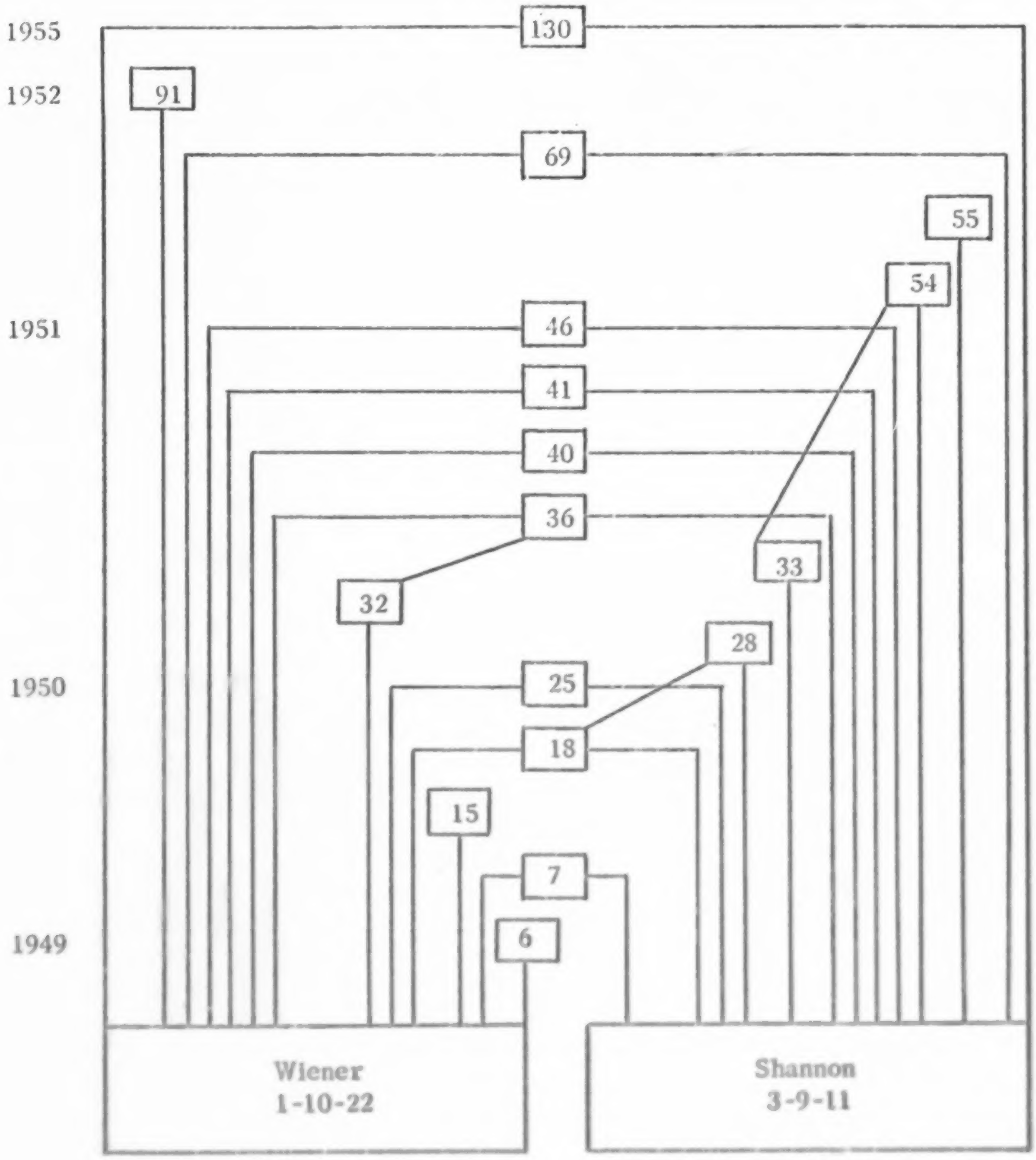
TOTAL NUMBER OF ARTICLES PUBLISHED PER YEAR FROM 1948 TO 1951[a]



[a] Broken line represents those articles pertaining solely to engineering during the 1948-51 period; solid line represents total articles on this subject.

CHART 2

CHRONOLOGICAL REPRESENTATION OF EARLY ARTICLES AS THEY DEVELOPED IN THE VARIOUS FIELDS[a]


1955
1952
1951
1950
1949
130
91
69
55
54
46
41
40
36
33
32
28
25
18
15
7
6
Wiener
1-10-22
Shannon
3-9-11

[a] The fields represented above are as follows:

6. Computer
7. Electronics
15. Psychiatry
18. Psychology
25. Engineering
28. Educ-Psychology
32. Biology
33. Physiology
36. Radar
40. Linguistics
41. Bio-Sociology
46. Library Work
54. Optics
55. Education
69. Statistics
91. Social Science
130. Journalism

in November, 1949, when Miller and Frick developed the sequential form of the theory to set up an index for the study of behavior. (18) Psychologists, who had long felt the need for a measure of information, found in this theory a tool with which to analyze human behavior. Once again, the hypothesis previously formulated about the adoption of the theory being speeded by a clearly apparent need for the theory bears itself out. After the first application of communication theory to psychology, five other important applications quickly followed. This does not include the many uses of the theory in work which had psychological implications, such as the use of the theory in education.

Chart 3 reveals the way in which psychology went about adopting the theory. Again, both Shannon and Wiener have been relied on, but here Shannon appears to have been somewhat more influential than Wiener. However, as the idea developed in this field, the first article by Miller and Frick emerged as an authoritative source upon which other articles drew.

Charts 4, 5, 6 and 7 follow the spread of the idea in engineering, biology and physiology, linguistics, and psychiatry respectively. In engineering, the honor of "original reference" is shared almost equally by Shannon and Wiener, but Shannon's work has been a little more widely quoted. Early use of the theory in biology and physiology, though, drew primarily on the work of Wiener. A possible explanation for this is that a study of the communication process in the human nervous system preceded attempts actually to measure the transmission of information through neural channels. On the other hand, first utilization of the theory in linguistics was based upon the work of Shannon. However, the situation is again reversed in the field of psychiatry where the limited utilization of communication theory relies almost entirely upon the work of Wiener. Here, it seems that again the mathematical measurement of information is not so important as the theoretical study of communication in explaining the function of the brain.

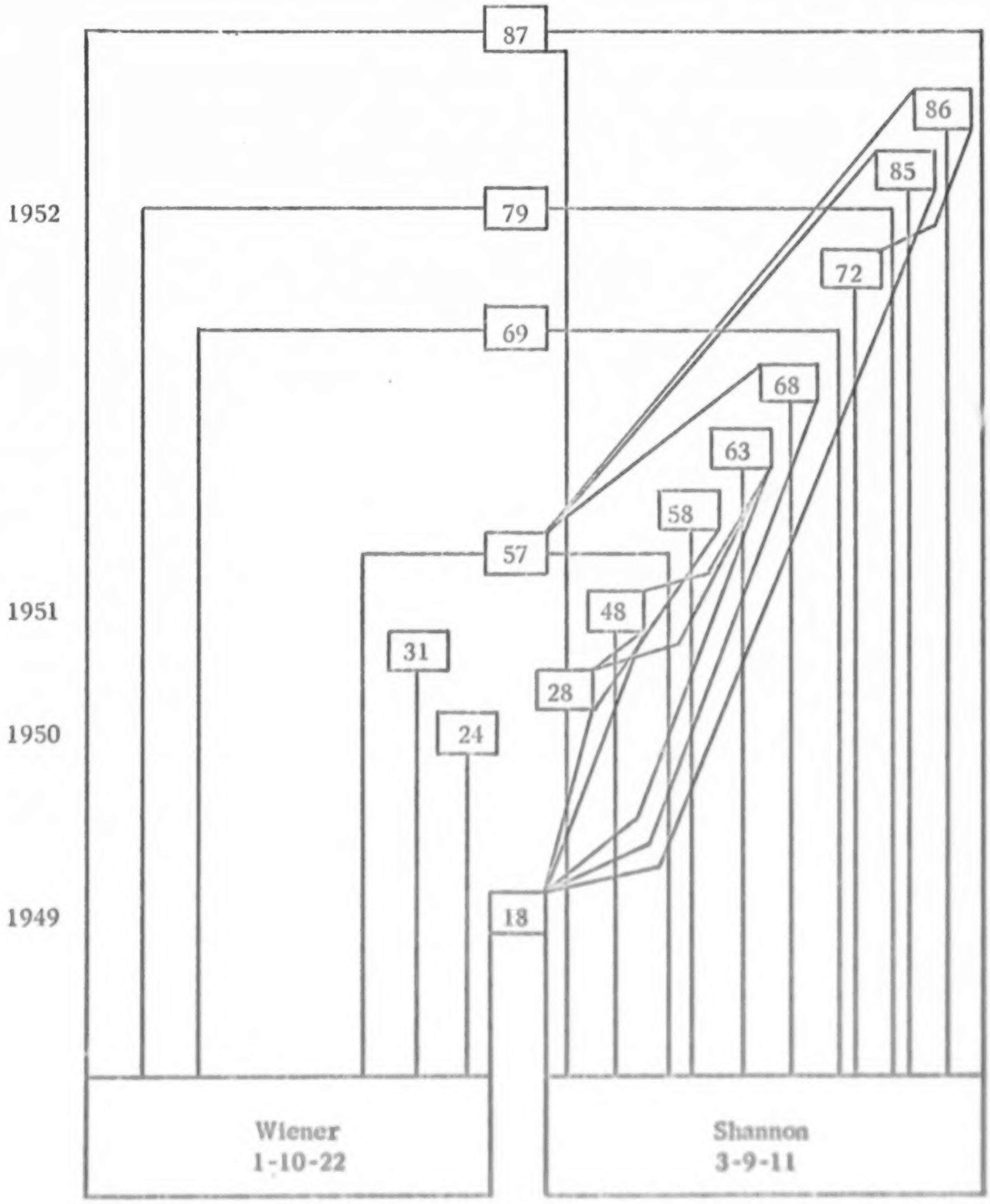
One fact made clearly apparent by all of these charts is that articles in scientific journals were by far the most important channels for the development of this idea. They far outnumber books and technical reports appearing on the subject, and in almost every case are responsible for the initial development of the idea in the disciplines to which it has spread.

The characteristics revealed by these tables and other charts and tables not reproduced here, together with previously discussed factors in the spread of this idea, suggest several hypotheses.

First, because the idea dealt with matters of common interest, it was able to spread more rapidly between disciplines. This would mean, then, that since the idea did spread so widely, each field into which it entered must have had some interest in common with other fields embracing the idea. As Wiener has pointed out, this common interest is communication. Every field into which

CHART 3

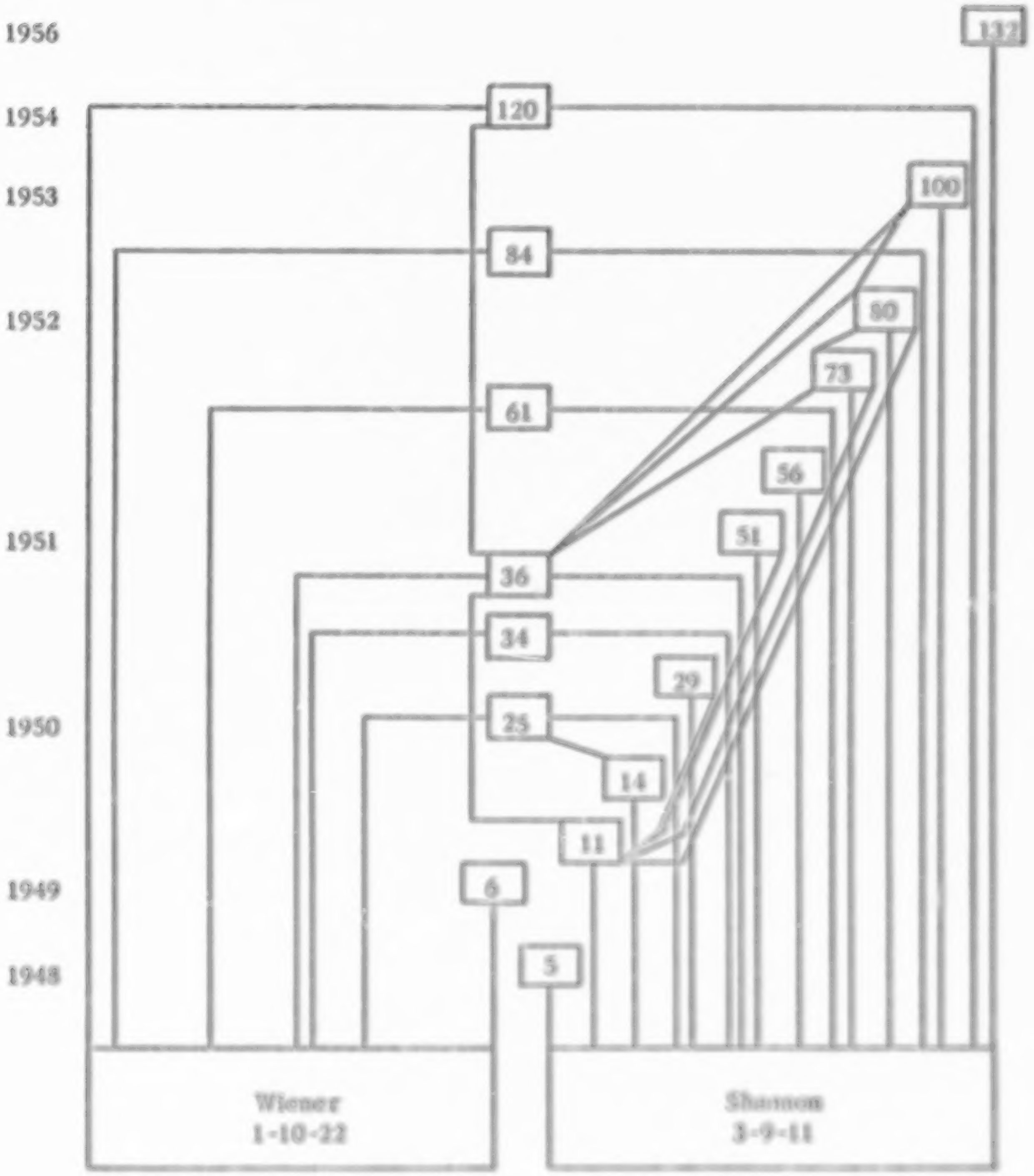
DEVELOPMENT OF THE THEORY IN PSYCHOLOGY THROUGH 1952[a]


87
86
85
1952
79
72
69
68
63
58
57
1951
48
31
28
1950
24
1949
18
Wiener
1-10-22
Shannon
3-9-11

[a]All numbers correspond to listings in the bibliography; 18 is in the pioneer article by Frick and Miller.

CHART 4

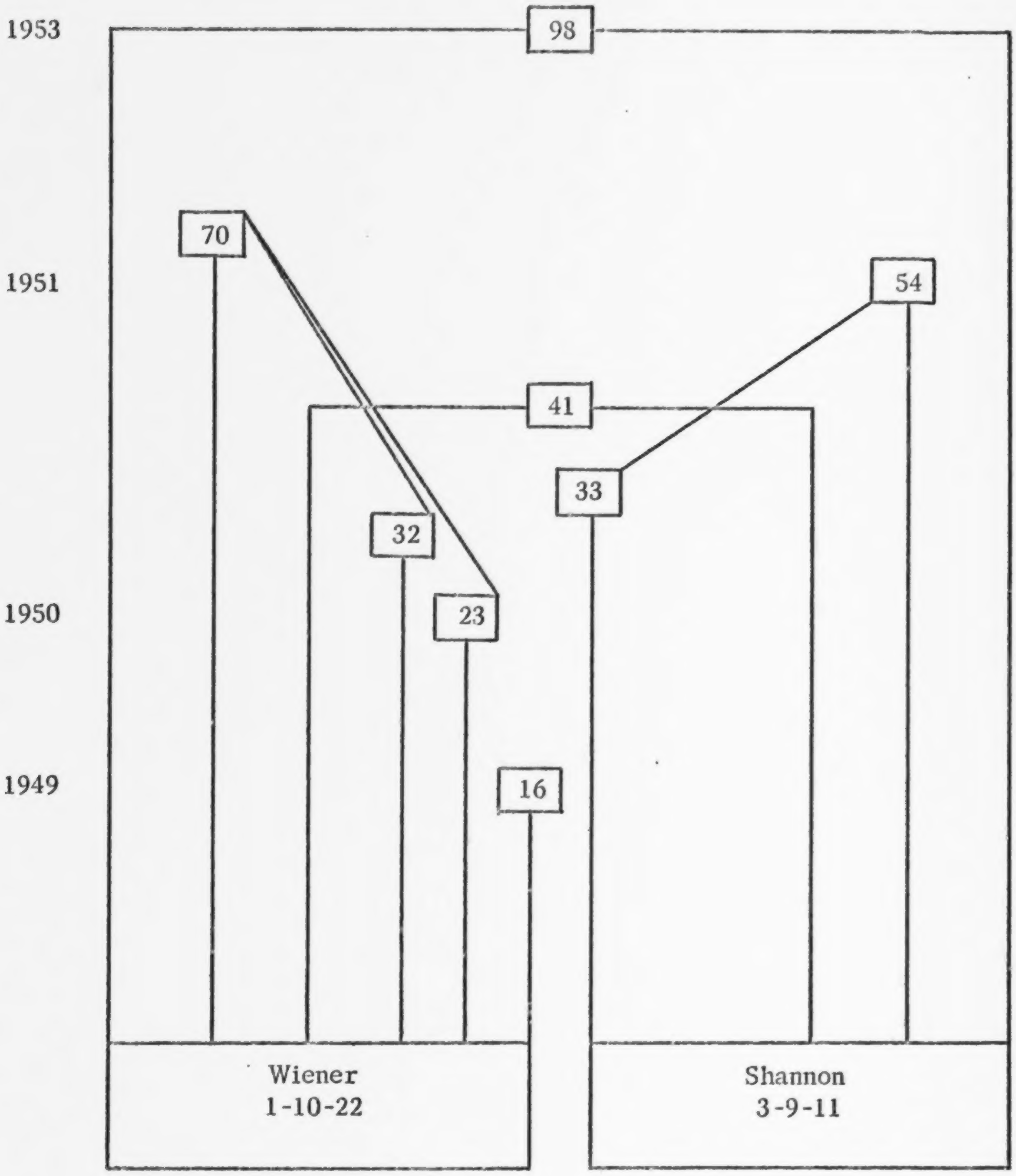
DEVELOPMENT OF THE THEORY IN ENGINEERING[a]


1956
1954
1953
1952
1951
1950
1949
1948
132
120
100
84
80
73
61
56
51
36
34
29
25
14
11
6
5
Wiener
1-10-22
Shannon
3-9-11

[a]All numbers correspond to listings in the bibliography.

CHART 5

DEVELOPMENT OF THE THEORY IN BIOLOGY AND PHYSIOLOGY[a]

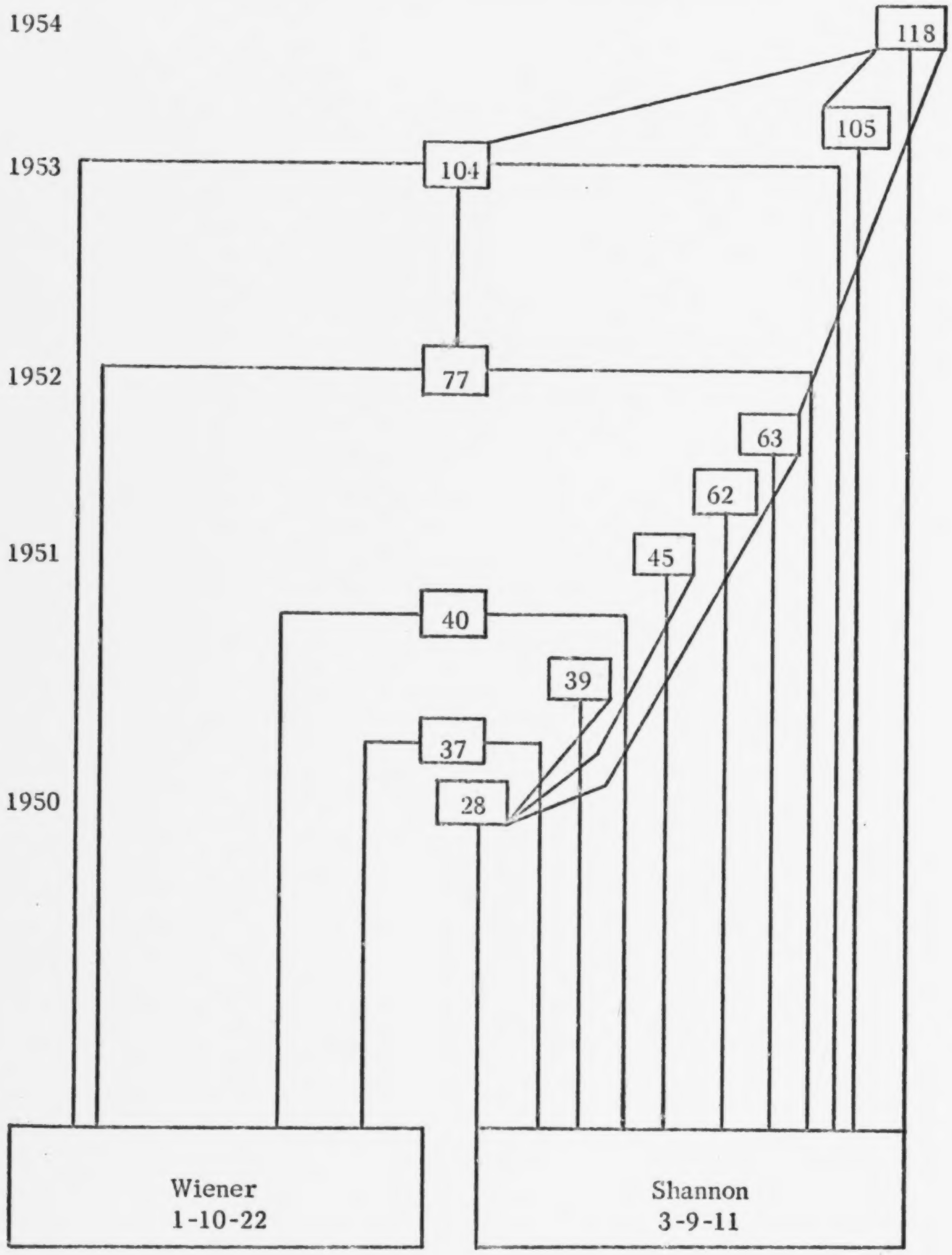

1953
98
70
1951
54
41
33
32
1950
23
1949
16
Wiener
1-10-22
Shannon
3-9-11

[a] All numbers correspond to listings in the bibliography.

3

CHART 6

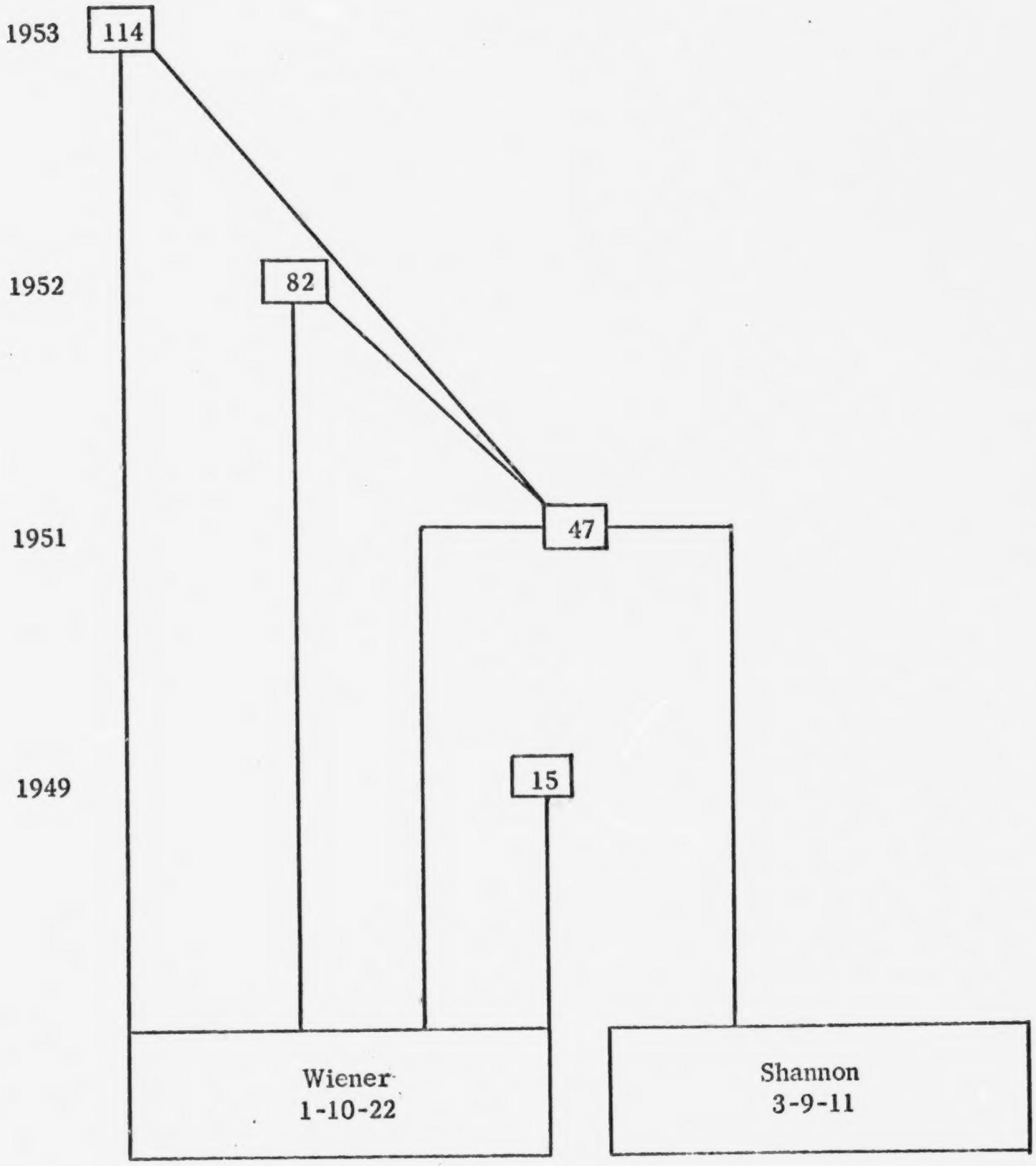
DEVELOPMENT OF THE THEORY IN LINGUISTICS[a]


1954
1953
1952
1951
1950
118
105
104
77
63
62
45
40
39
37
28
Wiener
1-10-22
Shannon
3-9-11

[a] All numbers correspond to listings in the bibliography.

CHART 7

DEVELOPMENT OF THE THEORY IN PSYCHIATRY[a]


1953
114
1952
82
1951
47
1949
15
Wiener
1-10-22
Shannon
3-9-11

[a]All numbers correspond to listings in the bibliography.

the theory has entered is concerned to some degree with communication in either man or his machines. Shannon's measure of the capacity of a communication channel, as the general statistical concept of communication, was a development that could be utilized by many fields.

However, failure to apply the theory in such fields as political science does not necessarily mean that these fields do not share an interest in communication. There are other explanations why some fields have failed to utilize the idea. Some of these fields have not felt the same need for a quantitative theory as engineering, for example, has obviously felt. Furthermore, the theory has limited application to human, meaningful communication, and some fields have therefore shied away from it.

The fact that the theory might not conform to the methods of some fields and, therefore, will not be used by them, leads us to another hypothesis suggesting that the idea has spread to other disciplines in proportion to its congeniality with their methods. The idea we are concerned with is a highly technical theory which requires a great deal of mathematical sophistication to follow. This fact limits its use to those fields where mathematics is a familiar method and can be readily used. Those fields in which statistical methods were being employed when the theory was developed were in a much better position to understand the theory and adapt it to their own methods. Engineering, a highly mathematical field, was a logical place for such a theory to develop, and it is not surprising that it should next spread to psychology where the importance of statistical methods had long been recognized and employed. The utilization of statistical methods has been a significant factor in almost every field which has made widespread use of the theory. The theory has not made much headway in any field where mathematics is little used. On the other hand, there are some highly mathematical fields where communication theory has received little attention. In these fields, the other prohibitory factors mentioned above are most likely controlling.

The fact that the theory has received attention in some fields without the use of elaborate statistical methods necessitates another hypothesis -- i.e. the idea seems to have spread to other disciplines in proportion to its analogic and suggestive value. An example of this is found in the field of journalism. In 1954, Dr. Chilton Bush used the theory's concept of noise analogically to explain how various factors operate to interfere with a message and destroy its efficiency. (117) Dr. Wilbur Schramm demonstrated the analogical power of the theory by showing how Shannon's mathematical formula for the handling of such noise could be used in solving various problems found in the mass media. (130) He pointed out that the formula $W \log_2 (\frac{P+N}{N})$ (where W is band width, P is power of transmission, and N is noise) means that there are three ways to achieve greater efficiency in the transmission of information: (1) by reducing noise, (2) by increasing band width, or (3) by increasing power. He suggested a practical application of this concept to a particular problem in mass communication.

Importance of Centers

Another generalization which seems to emerge from this study is the importance of centers in the spread of this idea. By centers are meant those places where the idea gains a large following, where new developments and interpretations are exchanged, and wide application results. At these centers often people from many disciplines are brought together, and through their interaction and cross-stimulation the seeds of the idea are scattered and begin to germinate. Because these different uses of the idea are concentrated, the idea gains impetus and spreads all the faster. These centers, because of their broad interest in the idea, often arrange formal seminars and symposia which in turn give the idea to the world at large. It is through the activity at this level that the existence and importance of these centers become most obvious. At least three such centers seem to have been instrumental in the spread of this idea. They are the Bell System Laboratories, the Massachusetts Institute of Technology, and the University of Illinois.

In order to illustrate the function of such centers in the spread of this idea, an interview was conducted with Dr. Wilbur Schramm who was head of the Communication Institute at the University of Illinois at the time communication theory was receiving impetus there. He reported the following information: At the time Shannon's article was published, the University of Illinois was experiencing a regeneration of interest in electronics. The electronics men picked up Shannon's article very early. Scientists at Illinois, as elsewhere, were talking of the need for a computer, and the new capacity theory was related to that. Louis Ridenour, a physicist, and Warren McCulloch, a psychiatrist, also quickly picked up the theory because it was such a useful explanation of the communication process in their respective fields. Ridenour, then dean of the Graduate School at the University of Illinois, realized the potential of the article, showed it to Schramm, who was in charge of the University Press, and suggested that Warren Weaver, who was with the Rockefeller Foundation, write a popular piece to accompany Shannon's original article and that the two works be published in book form. This suggestion was followed, and, as has been stated before, the book had a remarkable, world-wide circulation. Immediately following publication of this book, the idea was widely discussed around the University. This discussion was both formal and informal. It took place both in lectures and over the coffee cup. The electronics and physics departments made plans to build an electronic computer which was completed in 1952. At the same time, the University received a large government contract to conduct a control system study which resulted in further investigations into communication theory.

Meanwhile, through the efforts of Ridenour, Schramm, and the Library School, a symposium was arranged for utilization of the theory in solving library problems. As a result of this study, a book entitled Bibliography in an Age of Science was published in 1951. (46)

Then, Henry Quastler, a physician and radiologist, returned to the University to do research and became interested in the application of the theory to biology. Due to the interest aroused by his work, a symposium was held in 1953 and resulted in the publication of the book Information Theory in Biology. (98)

Still later, through Charles Osgood's study of communication, interest in the idea spread to psycho-linguistics and psychology. George Miller, a psychologist long interested in the theory, came to the University to lecture, and shortly thereafter, a symposium on information theory in psychology was held and resulted in a book bearing that title in 1954. (127) A book on psycholinguistics (118) also came out with a prominent use of the theory.

Finally, Schramm, whose seminars had made many applications of the theory to social science, gave it application to the field of journalism in 1955 with his article Information Theory and Mass Communication. (130)

This brief description of the development of communication theory at the University of Illinois illustrates how instrumental such centers were in the spread of this idea.

The Idea and the Mass Media

The search through the New York Times Index to find news articles pertaining to communication theory was almost fruitless. All possible indices which might cover the theory from its inception in 1948 until December, 1956, were checked but led to the discovery of only one article concerned with the theory per se. This was a news story of December 31, 1951, reporting on a Graduate School Alumni Conference at Princeton which unsuccessfully attempted to utilize communication theory as a method of art criticism. The fact that only one article reported the theory during a period of eight years would seem to point to the conclusion that newspapers simply do not report scientific ideas in terms of their importance. Rather, they seem to report scientific ideas only in terms of what certain people have to do with them. This was the case in the news story mentioned above.

Such a conclusion is further supported by the fact that during the same period Shannon himself made the columns of the New York Times four times -- twice he was reported to have received awards for his work and twice he was quoted on gains made in automatic computer development.

A follow-up search of the New York Times Index for news stories concerning the new scientific field of cybernetics proposed by Wiener also supports the conclusion that newspapers are not instrumental in the spread of scientific ideas. Their interest in such ideas seems to appear only where human activity is involved.

The same, however, does not apply to popular magazines. Nine articles concerning communication theory were culled from the 1948 through the 1956 listings in the Readers' Guide to Periodical Literature. Two of these articles appeared in large national magazines. Life hailed Shannon as a scientist but mentioned his work only incidentally, while Time gave a popular explanation of the redundancy concept of information theory and stressed its importance to future developments. Two more articles were found in business magazines (Fortune and Business Week); both offered an explanation of the theory and stressed its importance to future developments. The Saturday Review of Literature published an article which dealt with Shannon as a personality but also mentioned his work generally. Two articles in Science Digest gave the theory brief explanation and mentioned future implications. Finally, two articles appeared in Scientific American, one giving a less complicated mathematical explanation of Shannon's original work, the other making mathematical application of the theory to melody.

In all these cases cited above, the theory was mentioned or discussed in the tone appropriate to that particular magazine. This seems to indicate that scientific ideas such as this are reported in popular magazines where they have relevance to certain groups of non-scientists.

Conclusion

It is not suggested that the spread of this idea has exhibited traits common to all ideas. The very nature of this idea may make some of its history unique. However, there are some traits which suggest a pattern common to the spread of scientific ideas in general. This study has sought to reveal this pattern and has led to the following hypotheses which are thought to be suggestive if not generally applicable:

1. An idea is often drawn from a flurry of current related activity, and, as it develops, gains impetus and speed of adoption from the same surrounding activity that gave rise to it.

2. The development and adoption of an idea is speeded by a clearly apparent need for the idea. This would seem to lend support to the old adage that "necessity is the mother of invention".

3. An idea spreads fastest in the discipline in which it develops. Three reasons for this are immediately suggested. First, the related work going on within this discipline presents a more favorable condition for the spread of the idea. Second, the authority of the source of the idea is quickly recognized and, therefore, more readily accepted. Finally, the vocabulary and methods are familiar.

4. An idea can spread more swiftly when it clearly deals with matters of common interest. Information theory dealt with communication which is common ground for many disciplines.

5. An idea spreads faster when it is in a language common to more than one science. The mathematics of information theory commended it to mathematically trained people in many fields.

6. An idea spreads to other disciplines in proportion to its congeniality with their methods.

7. An idea spreads to other disciplines in proportion to its analogic and suggestive value.

8. An idea often gives rise to centers which stimulate and shape its development. At one of these centers, an idea is the subject of much discussion, lecturing, and work before anything appears on it.

9. The spread of a scientific idea via the popular mass media is limited. It is reported in newspapers chiefly in terms of what people have done. In magazines, an idea is reported where it has relevance to certain groups of non-scientists.

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INNOVATION OF PARTICIPATION IN A MANAGEMENT

THOMAS W. HARRELL
with the assistance of ROBERT F. PIETROWSKI

Dr. Harrell is professor of Psychology and of Applied Psychology in the Graduate School of Business at Stanford University. Mr. Pietrowski was a graduate assistant at the time this study was made of a successful innovation in a large corporation.

INNOVATION OF PARTICIPATION IN A MANAGEMENT*

by

Thomas W. Harrell

with the assistance of

Robert F. Pietrowski

Acknowledgments

It is a pleasure to acknowledge the support and help of several people and a disappointment not to be able to recognize the cooperation of another essential group because of the situation. The study was suggested by Prof. Wilbur Schramm who also provided funds out of a grant from the Ford Foundation to the Institute for Communication Research, Stanford University. Mrs. Butler has typed the interview records from sometimes obscure notes.

The company managers and supervisors who cooperated completely must be omitted here. In order to assure the freest and easiest publication it was decided in the beginning that the company would not be named.

I. Explanation of Title

This study began when Dr. Schramm asked what was new in business. One of two new things mentioned was the problem-solving conference. True the problem-solving conference is not brand new but it is relatively new as a systematic management method. Dr. Schramm was interested in the role of communication in innovation in business. This has been studied in other parts of the American culture. When a new drug is introduced, some physicians prescribe it earlier than others. Why? Some generalizations have been found. When a new hybrid corn has been developed, some farmers plant it earlier than others even though all may have heard about it. Why do some farmers make the innovation earlier than others? Analogously, Dr. Schramm was interested in why some managers adopt group problem-solving earlier than others.

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The Western Oil Company was chosen and agreed to cooperate in the study. * The company suggested the one objective of its marketing management development program would be more adequately designated as participation rather than simply as group problem solving and hence the object of the study was expanded. Obtaining participation of men in problems that concerned all in a group was thought to be important for the development of people. Participation was believed to be important for the promotion of growth. Participation had been present more or less within the company back to the limit of memory of managers who had been with the company up to forty years, so the word "innovation" is a little strong. The program did have as its objective the increase of participation. With some supervisors and managers this would be an innovation, with others an added emphasis, and possibly with others, no change.

The marketing management development program began in 1953 and one important phase of it was finished in June, 1958. Approximately four hundred managers and supervisors participated in groups of usually twelve each. Initially the program lasted ten calendar days including Saturday and Sunday when sessions were not held. Later for retail supervisors only the program was reduced to five days, on all of which there were sessions.

Some explanation was given each participant in writing before his attending the program. Each was asked to consider a topic for a conference which he would conduct.

The course included these conferences conducted by each of the twelve participants. Present at each session was a consultant who would act as friendly critic after the conference. Each session opened with members of management stating its purpose, with an emphasis on the development of people. High members of line and staff management participated for a few hours with each group. There were separate lecture-discussion sessions led on broad topics pertinent to the development of people, such as types of leadership, motivation, individual differences, communication, and appraisal. In the ten-day program a one-and-a-half day session on understanding people was led by an outside psychologist. In the five-day program this time was cut from one and a half days to under half a day.

To summarize, the program was similar in that it included as one major objective encouraging participation among subordinates, to that of many company programs of human relations training for management. It was different from many, however, in maintaining small groups of participants, in assuring active participation of all participants in their conferences, and in most, but not all of the other sessions there was an emphasis on discussion. Further it was unusual in having the active participation by important members of line and staff management.

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* This is not the real name of the company.

II. Literature

There have been a number of studies of the effectiveness of management development programs although only two that have rigorously attempted to find out whether managers behaved any differently after training. Almost always the participants have liked the programs. It is not unexpected that they would like them because it usually is seen as a mark of distinction to be chosen, and generally the sessions are conducted in an interesting location where good food and drink are served free of charge among pleasant associates. The question persists, do they behave any differently? In the only two searching studies on this crucial question, one in the International Harvester Company (Fleishman, Harris, and Burtt, 1955), and the other at Detroit Edison (Hariton, 1951), the results were not positive. These have been reviewed in detail elsewhere (Harrell, 1958). Both of these were in production, not marketing as in the present study and both were limited to the training of first-line supervisors. In both cases when subordinates were queried back on the job their over-all responses showed no significant change in the desired direction. In fact, there was a change in the "wrong" direction in Harvester. In both companies this was interpreted as being due to the greater strength of the example set by higher management who did not practice what the first-line supervisors had been preached in the training sessions.

III. Object

The object of the present study was to find out whether there had been any change back on the job in this situation. The groups selected for particular study were retail supervisors and district sales managers. The retail supervisor has under his supervision four to ten company-operated service stations and maintains contact with a larger number of independent dealers who sell the products of the Western Oil Company. The district sales manager supervises approximately four sales representatives and maintains contact with wholesale distributors who sell company products.

The retail supervisor and the district sales manager were chosen for study since they were the most numerous of the groups participating in the program. In each instance their bosses up the line had also participated in the program and consequently this might lead to the expectation of more positive results than in Harvester and Edison. One hypothesis was therefore:

1. There has been a change in the behavior of retail supervisors and district sales managers that can be attributed to the management development program.

A second hypothesis developed from a suggestion from the consultant who had worked closely in setting up and conducting the program. He suggested that whatever change there might be would be stronger where the boss of the retail supervisor or the district sales manager encouraged participation. This was a particularly pertinent suggestion in view of the interpretations of the lack of positive results in Harvester and Edison. The second hypothesis is therefore:

2. Change will be greater in the retail supervisor and district sales manager where their bosses encourage participation.

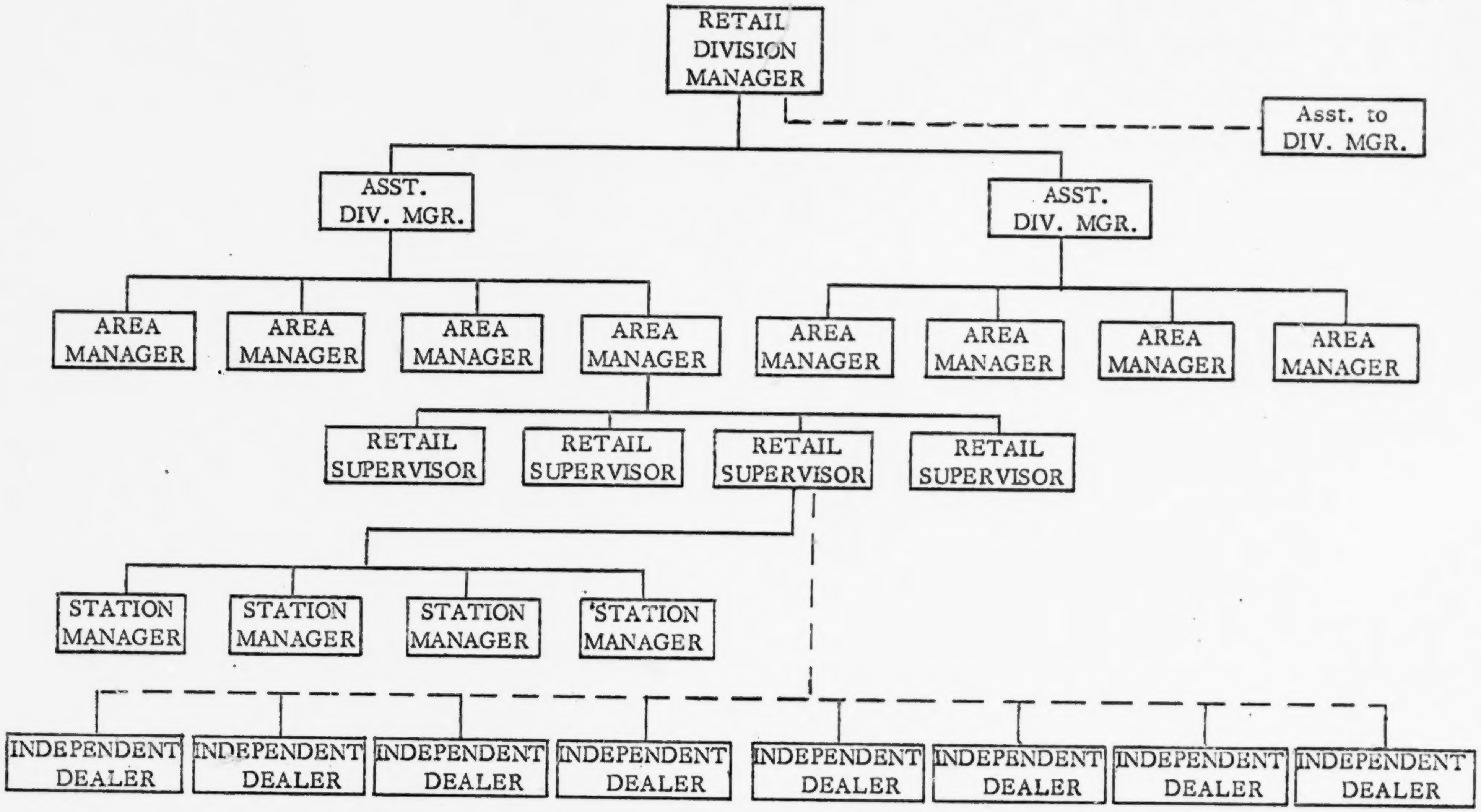
IV. Method

The personnel manager of the marketing organization, Western Oil Company, provided a rating of the two retail division managers out of the thirteen retail divisions who he considered encouraged participation the most and two the least. Similarly he provided the names of the two wholesale regional managers out of the ten wholesale regions who in his opinion encourage participation the most and two the least. The reliability and validity of this rating are not known. Therefore four retail divisions and four wholesale regions were chosen for study with an additional division and region for a preliminary study of interviewing method where interviews were also completed and the results used in the study.

To probe for depth the interview was chosen as the method of looking for change. The interview questions varied somewhat with the organization and level of interviewees. The interview schedules are shown in Exhibits 1 to 5. It was recognized that some interviewees would be polite and in spite of all disavowals might tell what the interviewer was believed to want. This was recognized as a particular hazard here since the interviewer, the author, had known many of the interviewees when he led the day-and-a-half session on understanding people. On the other hand this acquaintance had the substantial advantage of permitting a rapport which could lead possibly at times to even greater frankness than with a new acquaintance.

It was decided to interview retail supervisors and their bosses and district sales managers and their bosses. There were three levels above the retail supervisor in the division, as shown in Figure 1, and two above the district sales manager in the region as shown in Figure 2. Not only the immediate boss of the retail supervisor, the area manager, but his boss, the retail division manager were also to be interviewed along with the assistant division managers and the assistant to the division manager. The wholesale regional manager was to be interviewed as well as the assistant managers and the assistant to the manager.

It was thought that the most crucial evidence concerning change, if any, could come from subordinates. Therefore it was desired to interview the subordinates of the retail supervisors and the district managers. The home office


RETAIL DIVISION MANAGER
Asst. to DIV. MGR.
ASST. DIV. MGR.
ASST. DIV. MGR.
AREA MANAGER
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AREA MANAGER
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AREA MANAGER
RETAIL SUPERVISOR
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STATION MANAGER
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INDEPENDENT DEALER
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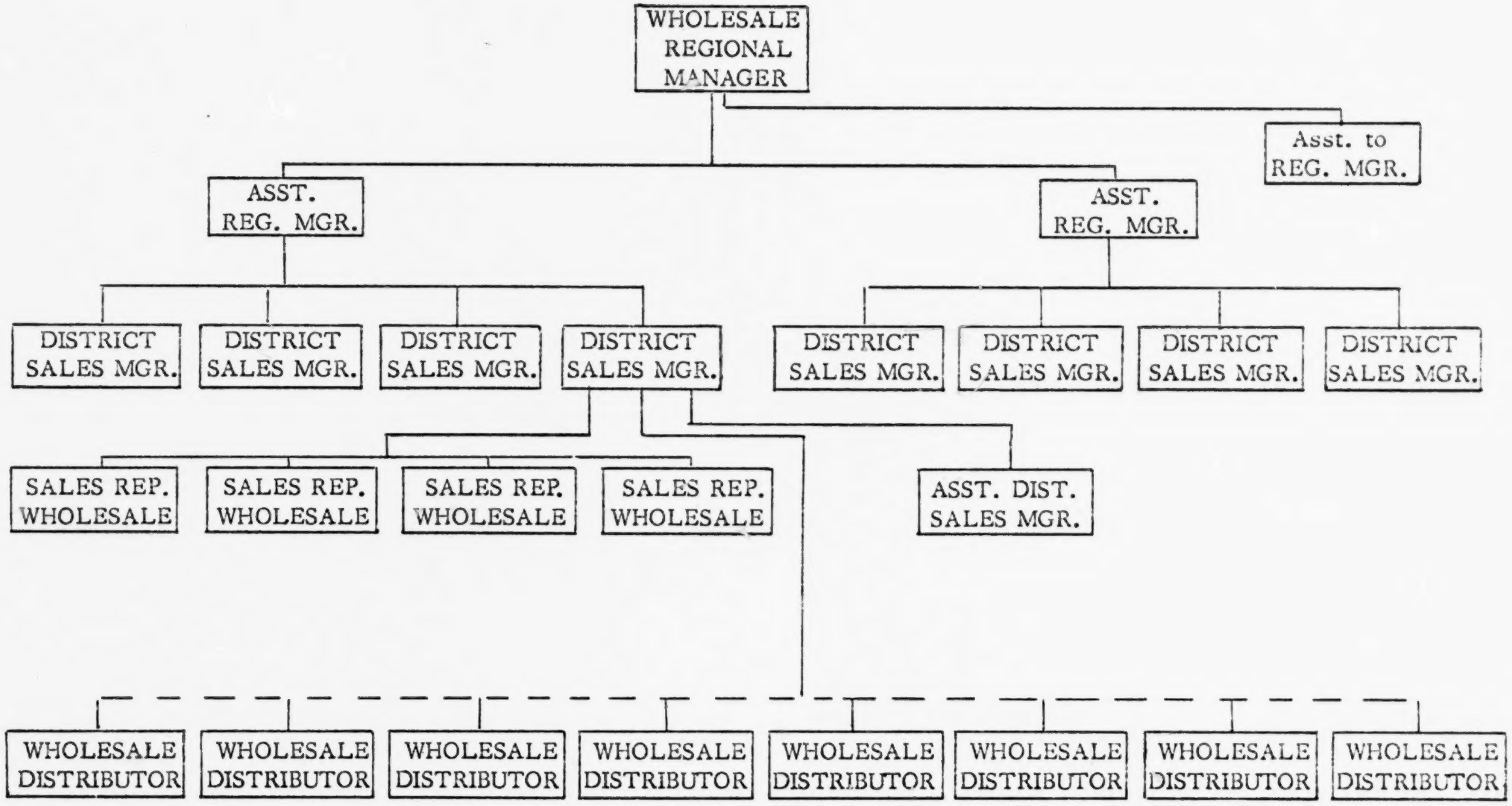
Figure 1 - Partial organization of retail department, Western Oil Company


WHOLESALE REGIONAL MANAGER
Asst. to REG. MGR.
ASST. REG. MGR.
ASST. REG. MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
DISTRICT SALES MGR.
SALES REP. WHOLESALE
SALES REP. WHOLESALE
SALES REP. WHOLESALE
SALES REP. WHOLESALE
ASST. DIST. SALES MGR.
WHOLESALE DISTRIBUTOR
WHOLESALE DISTRIBUTOR
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WHOLESALE DISTRIBUTOR
WHOLESALE DISTRIBUTOR

Figure 2 - Partial organization of wholesale department, Western Oil Company

of the Western Oil Company would permit interviewing subordinates only with the approval of the respective regional and division management.

For each retail supervisor it was desired to interview two subordinates, a company station manager, and an independent dealer. The independent dealer is not exactly a subordinate, but is functionally one to some extent.

For each district manager it was similarly desired to interview two subordinates, a sales representative wholesale and a wholesale distributor. Again the wholesale distributor is not a subordinate, but is functionally one to some extent. All interviews were made in June, July, and August, 1958.

V. Results

The preliminary results quickly changed the method outlined above. It soon appeared that there were some results among retail supervisors but less tangible results among district sales managers. One home office supervisor suggested that perhaps the retail side needed to change more than did the wholesale. Whatever the explanation, the results looked different very early. Consequently since time and funds were limited, the design of the study was immediately changed to exploit the findings. It was decided to concentrate on the retail supervisor and to drop the wholesale district manager. In other words, if there were any positive results to be had, it was desired to find as many of them as existed.

A second early finding was that there was less change seen by the independent dealer than by the company station manager. For the same reason as above, interviews were therefore stopped with independent dealers.

Results were obtained from five retail divisions. Two of the division managers were rated high, two rated low in the extent to which they would encourage participation. The fifth was in the middle. The responses from each of the five were tabulated.

Retail. Ninety-two interviews were conducted with members of the retail organization. The interviewees were thirty-six retail supervisors, fourteen managers at division level, seventeen area managers, and twenty-two station managers. In addition to these eighty-eight, four interviews were conducted with independent dealers who are close to the retail organization but not officially a part of it.

Influence of the boss. It was mentioned above that of the five divisions in which interviews were made that two division managers were rated as highest in the company to the extent that they were judged to encourage participation, and two division managers were rated lowest. The fifth division was therefore somewhere in the middle in the extent to which its manager rated. A comparison will be made between the responses in the two divisions whose managers were rated by the home office as encouraging participation the most, with those in the other three divisions.

Area and division management. Area managers have been combined with division managers, assistant division managers and assistants to division managers for the purpose of tracing the impact of the management development program. At the division level, interviews were held with five division managers, five assistant division managers, and four assistants to division managers who are the office managers and essentially the personnel staff man of the division headquarters. Each division typically has two assistant division managers who divide the supervision of area managers. In two of the divisions studied there was only a single assistant division manager, and one of these was not available for interview. The division management works so closely together that they generally share the same judgment of area managers and retail supervisors, although there is some difference of opinion, probably more so with respect to the retail supervisors who are farther away organizationally than to the area managers. Seventeen area managers were interviewed. These are the immediate superiors of the retail supervisors, the central focus of study.

The personnel manager of the marketing organization had rated two of the division managers as highest in encouraging participation and two as lowest. The fifth division manager studied was intermediate in this rating and was included with the two division managers rated lowest. The area and division managers were divided into two groups of "high participation" according to the rating of the division manager as to the extent to which he was judged in the home office as encouraging participation. Of the thirty-one managers, eighteen were in the low group and thirteen in the high. This grouping and consequent analysis of response will be a link in the chain of evidence for testing the hypothesis that the shadow of the boss, namely the division manager, will show itself in the actions of his subordinates, i.e. assistant division managers, assistants to the division manager, and area managers.

There is a striking difference in the responses of the two groups in answer to Question 2. "To what extent do you think this program could be expected to be useful for retail supervisors?" None of the low participation group were strong in their view of any positive value of the program, where 54 per cent of the high participation group were very strong. These results are shown in Table 1. All of the thirty-one managers except one thought that the program could be expected to be useful for retail supervisors, although the managers under the two high participation division managers were much more enthusiastic. The more specific reactions were to improving participation and communications through understanding others and becoming a better listener. It would appear from this that the influence was seen as dealing more with individuals than with group participation in the problem-solving conference.

Table 1.

Tabulation of extracts and summary of division and branch managers' answers to Question 2: "To what extent do you think this program could be expected to be useful for retail supervisors?"

Low Division Manager*		High Division Manager**	
Code #	Extent Answer	Code #	Extent Answer
100	Develop awareness of need of good employee relations	107	Retail supervisors got a lot out of program
101	Learning to deal with people -- be tolerant -- good listener	108	See definite improvement in supervisors
102	Development of leadership through democratic principles	109	Best thing that's happened in my 35 years in company
103	Better participation -- better understanding -- better communications	110	Wonderful in every respect -- counseling, appraisal, conference, etc.
104	No specific comment	113	Of extensive value. Counseling especially important
105	Learning to listen to other fellow -- better communications	115	Participation invaluable -- can't measure good it has done
106	Very valuable -- using to good advantage	116	Best thing company has done
111	Better attitudes toward station managers are apparent	200	More conscious of other's viewpoint, more observant of human behavior
112	Supervisors less autocratic now	202	Better understanding of associates' problems -- subordinates and superiors -- as well as own
114	Teaches to conduct conference and improve participation	204	Program of more value to retail supervisors than other personnel
201	Improve communications -- value of conference technique -- better understanding	205	Better communications and understanding of human relations
203	Stimulates person to think	207	Very helpful -- especially for man without much experience with company people
206	Good program but needs to be reviewed constantly	208	Very useful -- improved methods of communications -- better handling of people
209	Focuses attention on communications -- responsibility in area of human relations		

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* These are the responses within the two divisions whose division managers were classified initially by the home office as being lowest in encouraging participation plus one division whose manager was classified as being neither among the two highest nor the two lowest in encouraging participation.

** These are the responses within the two divisions whose division managers were classified initially as being highest in encouragin participation.

Table 1 -- (Continued)

	Low Division Manager	High Division Manager
210	Helps to understand people and their motives	
211	Value of counseling in handling people	
212	Understand to motivate subordinates and to supervise intelligently	
213	Don't think can measure	
Very strong	Zero	Seven (54%)
Strong	16 (89%)	Six (46%)
No comment	2 (11%)	Zero

Twenty-six of the thirty-one managers thought that the program had brought specific changes in their subordinates and many were able to give examples. Results are extracted and tabulated in Table 2. There is no significant difference between the two groups. On the other hand, the most specific examples of improvement on the part of subordinates were given by the high participation group. For retail supervisors the greatest area of improvement seen by area managers was in better relationship with station managers.

Table 2.

Tabulation of extracts and summary of division and branch managers' answers to Question 3: "Do you feel that program brought about any specific changes in job performance to any of your supervisors?" or, to division managers, "...changes in job performance to any of your area managers?"

Low Division Manager		High Division Manager	
Code #	Extract Answer	Code #	Extract Answer
100	In some but not in others	107	X developed new drive; Y has toned down aggressiveness; Z -- tremendous improvement
101	All doing a better job of handling people -- more analytical in their thinking	108	X -- better decisions; Y -- improvement in judgment; Z -- improvement in judgment
102	Didn't know situation before training -- think has been useful however		

Table 2 -- (Continued)

Code #	Low Division Manager	Code #	High Division Manager
103	Very definitely	109	Everyone has improved. More enthusiasm; better handling of people
104	Of great assistance in handling people	110	Nothing definite
105	Makes one more tolerant	113	Yes but nothing specific to X, Y, and Z
106	Haven't noticed as yet	115	X less autocratic; Y smoother -- took off rough spots; Z doing perfect job
111	Yes -- X more confidence -- better communications; Y decided improvement; better rapport with station managers	116	Yes -- no specific examples
112	Yes, but nothing drastic -- more understanding, willing listeners	200	All doing better job. Empathy
114	Helped in getting closer to men -- more tolerant	202	Less talking, more listening -- excellent conference leaders
201	More considerate, less authoritarian -- now ask and listen	204	Very effective use of conference method for problem solving
203	Maybe -- most effect apparent in newer men	205	Have good men -- focus on human relations will help, of course
206	Value may be intangible -- certainly made more tolerant	207	Better handling of personnel
209	Helps man accept responsibility -- improved communications	208	Increased participation -- better listeners
210	Understand motivation -- how to get people to do things		
211	Increased tolerance -- pretty intangible		
212	Learning to help others arrive at their own decisions		
213	More able to communicate		
Yes	15 (83%)		11 (85%)
Maybe	2) (17%)		1) (15%)
No	1)		1)

The results from Questions 4b and c of Interview Form, Exhibit 3, have not been tabulated since the identical wording of the questions was not used in the initial division studied, where the preliminary form of the interview was tried.

Retail supervisors. All of the retail supervisors had attended the management development program in Western City, thirty of them for five days and only six for ten days. Twenty had attended in 1958, twelve in 1957, and four in 1956.

Seventeen retail supervisors were interviewed in the two divisions whose managers were judged to encourage participation; nineteen in the other three.

The responses to Question 3, "To what extent do you think that this program could be expected to be useful for retail supervisors?" were classified as very strong, strong, yes, qualified by the research assistant who did not know the home office ratings of the division managers. Results are shown in Table 3. About nine out of ten give a strongly positive response, but there is no significant difference between the low and high division manager groups. Answers by the retail supervisors' bosses to same question, Table 1, support the evidence for change.

Question 3 was answered by almost all retail supervisors in terms of himself. All but three were strongly positive; four stating that it helped in personal as well as business relationships. Fourteen gave a very strong positive reaction. Seven stated that it was the best experience they had had. Nineteen additional supervisors gave a strong positive reaction. Only three qualified their endorsement of the program.

Table 3.

Extracts and summary of answers by retail supervisors to Question 3: "To what extent do you think this program could be useful for retail supervisors?"

Low Division Manager		High Division Manager	
Code #	Extract Answer	Code #	Extract Answer
1	Excellent for younger men -- more aware of human relations	8	(No specific comment)
2	Came away with something useful	9	Shows quite a change in management thinking
3	Conference technique greatest value -- exchange of ideas -- experience	10	Best program I've had. Valuable in business and personally
4	Changed attitude toward subordinates -- better rapport	11	(No specific comment)
5	Helps to develop proper atmosphere	13	Finest program I've ever had
6	Best thing ever happened to me	15	Helped organize my work
		16	Best five days I've ever spent. Useful personally in business
		17	Golden rule attitude toward people

Table 3 -- (Continued)

Code #	Low Division Manager	Code #	High Division Manager
7	Conference technique extremely helpful -- try to use	18	Participation
12	Best five days ever spent -- broader understanding -- human relations. Showed company interest in me	19	(No specific comment)
14	Finest program ever had. Improved outlook	20	Increased appreciation of other people's problems
27	Better communications -- helped in personal life	21	Help in organizing work. Better communications
28	Valuable information -- some too technical	22	Acknowledge human being -- motivation
29	Helps one assume responsibility -- self-confidence	24	Best thing ever happened. Democratic ideals
30	Should repeat -- expresses changing view of management	25	Of use (no specific comment)
31	Opens your eyes, makes you stop and think	26	Helped in dealing with subordinates
32	Improved skill in human relations		
33	Program great help -- communications		
34	Have not been able to apply		
35	Broadens outlook -- very beneficial in regard to communications		
36	More tolerant -- valuable both personally and business-wise		

Very strong	7 (37%)	4 (41%)
Strong	10 (53%)	8 (47%)
Yes	1 (5%)	0
Qualified	1 (5%)	2 (12%)
Total	19 (100%)	17 (100%)

The big majority gave some explanation of what they had gotten from the program although seven did not. The most frequently mentioned value was emphasis on the person as an individual with improved communication with subordinates being the second most frequent response.

Questions 4 and 4a. "Do you feel that the program brought about any specific changes in your job performance?"

"If yes, what changes?"

Thirty-two of the thirty-six retail supervisors answered affirmatively. The two most frequent answers were the same as those explanations volunteered for Question 3 above. Fifteen of the supervisors mentioned better communication with the emphasis on their being better listeners. Three mentioned the value of counseling. The second most common change was an increased awareness and understanding of an individual's problems, mentioned by ten. The value of conference meetings was mentioned by five, and two each mentioned improved delegation and increased confidence. One mentioned a better understanding of management's viewpoint. Some supervisors mentioned more than one change.

In Questions 4 and 4a, where again the responses were classified without the knowledge of home office ratings, there is some difference between the two groups. Among the nineteen retail supervisors whose division managers averaged low in encouraging participation, fifteen answered "yes", with four answering "no" or qualifying their answers. Among the seventeen retail supervisors whose division managers were high in encouraging participation, all answered "yes" with no qualifications.

Questions 5 and 5a were not asked of the men in the division where the interview was pre-tested and hence there are too few cases to compare the responses under the two extremes of participation by division managers. Question 5 and 5a: "Do you feel that the program brought about any changes in the way you look at your job? If yes, what changes?"

In order of frequency the answers were:

improved cooperation -- teamwork
better understanding of individual's problems
increased confidence
value of counseling
better understanding of job
improved delegation

Question 6: "Has this program helped you solve specific problems or meet particular situations?" (Probe for practical value of program.)

About half of the supervisors answered the question specifically and positively. Most frequently their replies were to the effect that they were better able to help the station managers help themselves. The following extracts are instances of this:

made manager solve his own personal problems
letting managers run their own show
improved managers' ability to evaluate men
helped men solve their own problems through counseling
place responsibility of running station on manager's shoulders

Second most frequent response was improved communication. Some other specific answers:

helped handle aggressive union steward
helped set up sales contest
helped in handling a dismissal. (This was an interesting case in which the supervisor stated that before the program he would have been afraid to initiate the necessary action. In this instance, a service station salesman was in the supervisor's view clearly unfit, or at least incompetent. The supervisor asked him what he wanted to become. The salesman said that he wanted to be a sign painter. The supervisor asked him why he didn't get such a job. He did. Later the former salesman contacted him to thank him for putting him on the right track.)

Other responses were:

used conference to build sales program
handling terminations

Again, the answers to Question 6, "Has this program helped you solve specific problems or meet particular situations?" show slightly more favorable answers by the retail supervisors in the two divisions whose managers encourage participation. Eleven of seventeen supervisors under the division managers most encouraging to participation answered "yes", and in many instances gave specific examples. Nine of the nineteen supervisors in the other three divisions answered "yes". Results are shown by numbers of various responses in Table 4.

Table 4.

Answers by retail supervisors to Question 6: "Has this program helped you solve specific problems or meet particular situations?"

	Under Low Division Manager		Under High Division Manager	
	N	%	N	%
No and Don't know	10	53	6	35
Yes	9	47	11	65
Total	19	100	17	100

Question 7. "Have you been able to obtain individual participation from your station manager where you did not get it before?" (If yes, ask for an example.) The consensus was that participation had been obtained in most instances through giving subordinates a voice in decisions. Not all answered this way as eight stated that they always had had good participation even before the development program: three supervisors weren't sure that they had gotten more participation, two more made no comment and one was in a territory too new to judge. As shown in Table 5 the retail supervisors in the two divisions whose managers encourage participation gave slightly more positive answers.

Table 5.

Answers by retail supervisors to Question 7: "Have you been able to obtain individual participation from your station managers where you did not get it before?"

	Under Low Division Manager		Under High Division Manager	
	N	%	N	%
Yes	9	47	9	53
No, no comment, etc.	10	53	8	47
Total	19	100	17	100

Again on Question 8 there was a slightly more favorable answer by the retail supervisors in the two divisions whose managers were thought to encourage participation. The results are in Table 6.

Table 6.

Answers by retail supervisors to Question 8: "Have you changed in getting group participation?"

	Under Low Division Manager		Under High Division Manager	
	N	%	N	%
No or no reply	13	68	7	41
Yes	6	32	10	59
Total	19	100	17	100

Question 8a. "Do you get your station managers together to talk about a problem more often than you did before attending the program?"

Question 8b. "How often do you get them together now? Before?"

Thirteen answered that they did get their station managers together more often now. Of those answering no, two stated that they had always had regular meetings. Two answered that they now had fewer meetings, and one of these explained that it was because the meetings were better organized which was also the answer for a third supervisor who stated that he did not have more meetings. Several expressed a wish to hold more meetings but could not because of location or not being allowed by higher management to hold meetings on company time. The most usual frequency of meetings was once a month.

Question 8c. "What was the last problem discussed?"

Question 8d. "What method did you use?"

Question 8e. "With what success?"

Question 8f. "When?"

Extracts of the answers for the fourteen retail supervisors who answered this question are shown in Table 7. Most of the problems dealt with local sales issues using the conference method which could be attributed to the development program.

The above questions were not asked in exactly the same way in the "pretest" division and consequently the number of exactly comparable cases did not appear to be sufficient to split the group according to extremes of participation by division managers. The "pre-test" division was the one in which the interview form was developed.

Table 8 shows that the supervisors under the more participative division managers changed more in having more conferences.

Questions 8 g-k were dropped after it was found that few supervisors got the men on a station together. Questions 9, 12, and 13 are not pertinent to the hypothesis. Apparently question 10 was redundant. Consequently the answers to these four questions are not presented here.

Question 11. "What suggestion would you make to improve the program?"

Four made no suggestion; six stated that the program would be hard to improve. Almost all comments were concerned either with extending the program to station managers, and in some cases to assistant managers; or with

Table 7.

Extracts of answers to Questions 8c, 8d, 8e, 8f by supervisors.

Code	Problem	Method	Success	When
4	Sales	Told what to do	---	---
5	Sales	Told what to do	Hopeful	Last week
8	Tire sales	Conference	Terrific	July
9	Oil sales	Conference	Good increase	July
11	Communications	Open discussion	Effective	June
12	Appraisal and development	Conference	Think so	July
15	Battery sales	Conference	Increased sales	---
16	Sales	Conference	Terrific	May
17	Sales	Conference	Yes	May
18	Cash losses	---	Better control	April
19	Cash losses	Conference	100%	---
25	Manpower	Conference	Think so	---
27	Personnel	Conference	Think so	---

Table 8.

Answers by retail supervisors to Question 8a: "Do you get your station managers together to talk about a problem more often than you did before you attended the program?"

	Under Low Division Manager		Under High Division Manager	
	N	%	N	%
No or no answer	13	68	9	53
Yes	6	32	8	47
Total	19	100	17	100

some form of follow-up to the retail supervisors, i.e. refresher courses, reading lists, new materials, etc. Only four comments concerned the program itself: (1) Reading references should be distributed in advance; (2) more "coaching" prior to conference; (3) devote more time to union-management relations; (4) could be less technical.

A summary of some of the changes in participation is shown in Table 9.

Table 9.

Comparison of supervisors' changes in participation depending on leadership, according to supervisors.*

	Under Low Division Manager		Under High Division Manager		Total	
	N	%	N	%	N	%
Innovation	30	39	38	56	68	47
No innovation	46	61	30	44	76	53
Total	76	100	68	100	144	100

This also shows a comparison of the extent of participation in four responses between the retail supervisors who were under division managers judged by a home office representative to be highest in encouraging participation and the supervisors under three low division managers. This shows that there were innovations reported in about half the instances. The difference between low and high is significant at the level of 97 1/2 chances out of 100.

Station managers. Twenty-two station managers were interviewed according to the questions shown in Exhibit 1. Results of three of the questions have been analyzed in terms of whether or not their retail supervisors, who were their immediate bosses, were under one of the division managers rated as highest in encouraging participation or not. Table 10 shows that a slightly higher per cent of the station managers under high participative managers report that their retail supervisor gets them together to discuss problems. This difference is not confirmed when the last problem discussed is considered, (Table 11) but it is to the same slight extent when the method of meeting is considered. (Table 12) The conference method is used slightly more frequently by the high participative divisions. The last problem discussed (Table 11) shows that the meetings had practical problems under discussion. Still another question, recalling the date of the last meeting, again shows a slightly higher percentage in the high participative divisions. (Table 13)

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* Combination of Tables 4, 5, 6, and 8.

Table 10.

Answers by station managers to Question 3: "How often does your supervisor get you and his other station managers together to discuss problems?"

	Under Low Division Manager		Under High Division Manager	
	N	%	N	%
Get together	4	50	8	57
None	3)	50	6	43
No Answer	1)			
Total	8	100	14	100

Table 11.

Answers by station managers to Question 5: "Last Problem Discussed?"

Low Division Manager		High Division Manager	
Station Manager Code	Problem	Station Manager Code	Problem
50	Sales--personnel management--grievances	54	Tire sales
		57	None given
51	None given	58	None given
52	None given	59	None given
53	None given	60	None given
55	Tire adjustments	61	None given
56	Station expenses	63	Service procedures
62	None given	64	Customer relations
70	Supervising men	65	None given
		66	Sales objectives
		67	None given
		68	Accessory sales
		69	Service procedures
		71	Expense ratios
Problem given	Four		Seven
No problem given	Four		Seven

Table 12.

Answers by station managers to Question 5a: "Method?"

	Low Division Manager		High Division Manager	
	N	%	N	%
Conference	4	50	8	57
None given	4	50	6	43
Total	8	100	14	100

Table 13.

Answers by station managers to Question 5b: "When held?"

	Low Division Manager		High Division Manager	
	N	%	N	%
Recalled date	3	37	6	43
Did not recall date	5	63	8	57
Total	8	100	14	100

The greatest contrast between the two groups of station managers comes in answer to Question 7: "Is there anything in which you would like to have your supervisor have more training?" Here 71 per cent of the station managers whose division managers are believed to encourage participation said "No," compared to 50 per cent whose division managers are low or intermediate in encouraging participation. A tabulation of an extract of each station manager's response plus the summary is given in Table 14.

In two instances where the station managers under low division managers, Table 14, would like their supervisor to have more training, personality was mentioned, saying that in effect it was too late -- his personality cannot be changed. It is interesting to note that among the fourteen station managers under high division managers there was no instance of such a perception. This is reminiscent of Maier's observation (Maier, 1952) that some behavior of supervisors can be perceived as either personality or the need for training. Where the behavior is perceived as a personality trait, the conclusion is one of hopelessness. In

Table 14.

Tabulation of extracts and summary of station managers' answers to Question 7: "Is there anything in which you would like to have your supervisor have more training?"

Low Division Manager		High Division Manager	
Station Manager Code	Remarks	Station Manager Code	Remarks
50	Better delegation of responsibility. Closer contacts with managers and assistants.	54	Great improvement -- training helped.
51	Too late. Hard to know him; lacks tact; difficult personality.	57	Closer relationship with managers -- off-the-job get-togethers.
52	Don't think so.	58	Lack of technical knowledge -- don't know the manual.
53	Hard to say--don't know whether training can change personality.	59	Difficult to say.
55	How to train station men in product knowledge.	60	Not that I know of--they know their business.
56	Can't think of a single thing.	61	Not particularly.
62	Nothing specific.	63	Not that I can think of.
70	Don't know--one of the best men ever worked for.	64	Not that I can see.
		65	Nothing specific--training very helpful.
		66	Nothing specific--best organized man I ever worked for.
		67	Nothing--haven't had a problem he couldn't handle.
		68	Just give him more time to train me. Very good man.
		69	More round-table discussions at the station level.
		70	No.
Yes	Four (50%)		Four (29%)
No	Four (50%)		Ten (71%)

these instances the human relations training has been given, but the interpretation is being made that it has not taken because of the lack of reinforcement from the division management level through area manager and retail supervisor. Of course this speculation based on two cases needs additional evidence to be taken seriously.

All of the station manager interviews taken in toto show a very high regard for their supervisors, which, to some extent, is probably due to the results of the management development program. In answer to question 6: "How do you feel about asking your supervisor for help on a problem?", twenty-one of the twenty-two station managers stated that they usually get valuable assistance and always get a good reception. Only one respondent indicated any reluctance to approach his superior, and even he stated that this condition is improving. If these responses are representative for the Western Oil Company, its supervisors are not only very able but highly regarded by their subordinates.

While an attempt was made to have the station managers representative of the company, this was not, it must be admitted, completely successful. In several instances station managers were chosen who were the most senior, i.e. had had the longest experience as managers. In several instances the managers were in fact so senior that they were serving, or did on some occasions, substitute as retail supervisors themselves. In other instances the selection of the sample was based on proximity to the interviewer which often meant on proximity to the retail supervisor's office. Consequently the population of station managers was more senior than the average for the company and was under closer supervision in all likelihood because of their closer location to the retail supervisor. It is my impression that a more complete study of station managers, however, would support the finding from this sample that retail supervisors are unusually highly regarded by station managers generally.

A table has been put together to show several of the responses by station managers to innovations by supervisors, Table 15. This is broken down into whether the supervisor and station manager are under one of the division managers who was rated as highest in encouraging participation or not. The correlation with division manager continues to persist although it is not significant here as it was in the supervisors' interviews, Table 9. Looking again at Table 14, however, there is just as strong a trend favoring the high division manager as in Table 9. Table 14 seems to be one indication of the extent to which the station manager is satisfied with his supervisor. Ten of the 14 station managers in the two divisions whose managers were rated as being highest in encouraging participation had no suggestions for training or changing their supervisors. Several were very enthusiastic about their supervisors. There is a decided contrast among the station managers under low division managers. To summarize, the influence of the division manager appears to persist to the station manager, who is four levels below, through the assistant division manager, the area manager, and the retail supervisor. Further, the confirmation of change by the subordinate greatly strengthens the evidence that the supervisors have, in fact, changed.

Table 15.

Comparison of supervisors' changes in participation depending on leadership according to station managers. *

	Under Low Division Manager		Under High Division Manager		Total	
	N	%	N	%	N	%
Innovation	15	47	29	52	44	50
No Innovation	17	53	27	48	44	50
Total	32	100	56	100	88	100

* Combination of Tables 10, 11, 12, 13.

Wholesale. Initially it was intended to study the district sales manager and his subordinates and superiors in the wholesale organization to the same extent as was done in the retail organization with the retail supervisor. It soon became apparent that the one work month for interviewing would not allow a thorough study of both retail and wholesale, and since the retail organization seemed to be yielding somewhat more specific results of the development program, it was decided to reduce the effort within the wholesale organization so as to make the study more thorough on the retail side.

Only eighteen interviews were conducted within the wholesale organization and consequently the analysis of these relatively few cases has not gone to nearly the same extent as was done with the retail personnel. An organization chart of the wholesale organization is shown in Figure 2. Wholesale personnel interviewed consisted of two district managers, one assistant district manager, two sales representatives, wholesale, one wholesale distributor, and thirteen members of regional management who consisted of three regional managers, six assistant regional managers, three assistants to regional managers, and one credit manager. The latter was interviewed at the suggestion of a regional manager.

Regional management. Eleven of the twelve members of regional management thought that the program was of value for district sales managers. The values mentioned were tolerance and understanding, group participation, conference method, human relations, training, and communication. The consensus was that the conference method was the factor most responsible for stimulating participation. They all thought that their district sales managers got their men together more to invite participation than prior to the training program. District management itself asserted that it did not hold meetings more frequently; however, when held, meetings became the conference type due to the development program. The consensus at both regional and district level for improving the management development program was that it should be made a continuing one.

District managers. The two district managers and the assistant district manager agreed that the training experience was a valuable one and affected the way that they performed their job; at least they thought that they now view their jobs differently than prior to the training program. Comments centered around improved communication and the use of the conference method to develop participation.

Sales representatives, wholesale, and wholesale distributor. Although the respondents knew about the management development program, they did not know enough about it, apparently, to know how it could help the district manager in performing his job. Only one of the three respondents indicated any change in his district manager's behavior following the program. He stated that he had become more cooperative and sought out the sales representatives' opinions. The other two respondents indicated little or no change in specific behavior or in methods of obtaining participation. All indicated that they were free to make suggestions or ask questions of their district managers.

Discussion

It appears that the management development program did change the behavior of some of the managers and supervisors some of the time with respect to some people. The latter qualification, "some people", is added because of the lack of any finding that retail supervisors were seen as different by independent dealers, and this was confirmed with the single case of the wholesale distributor who did not see any difference in the district sales manager.

There is more contact between the retail supervisor and the station manager than there is between the retail supervisor and the independent dealer; likewise there is more contrast between the district sales manager and the sales representative, wholesale, than between the district sales manager and the wholesale distributor. The independent status of the independent dealer and the wholesale distributor make them harder to approach in the eyes of the respective company personnel.

The main point of the study is, however, that the two hypotheses were confirmed. (1) There is a change in retail supervisors due to the management development program. There is insufficient evidence to know whether or not district managers changed. (2) The effect of training is noticeably influenced by the division manager.

The effect of the division manager is interesting in that it seemed to go through four layers of supervision: (1) assistant division manager; (2) area manager; (3) retail supervisor; (4) station manager. At the fourth level, station manager, results were not statistically significant except on one question, 7, "Is there anything in which you would like to have your supervisor have more training?" Perhaps the influence of a division manager could not be expected to be more than was found. The division managers rated lowest in encouraging participation, did in fact believe in encouraging some participation, especially of individuals. The division managers rated highest in encouraging participation probably did not believe in encouraging group participation as much as some of their subordinate retail supervisors did. There was then, even among the extremes of division managers in their philosophy of leadership, not a completely clear-cut distinction. Furthermore the marketing organization, because of its geographic dispersal, may make the influence of the boss less than in a plant or office where the boss is physically closer.

There are several limitations to the study. The number of cases is not as great as would be desirable. The selection of the population of station managers would have been better on more of a chance basis. There was no measurement before the training as would have been ideal. Possibly the respondents were trying to tell the company what it wanted to hear since the interviewer was closely identified with the company because he had led a part of the management development conference for some of the managers and was therefore known by practically all the managers and supervisors to have worked for the company. On the other hand, this acquaintanceship might have been a strength as well as a limitation inasmuch as it provided a built-in rapport and allowed for closer questioning than might otherwise have been possible.

Many of the interviewees seemed to enjoy the interview. For those who had been in the development session with the interviewer it was "old home week". It was to a certain extent a refresher course. Certainly for the interviewer it was a pleasant emotional experience when so many responses seemed genuinely to state a value and in some instances pointed to specific changes attributed to the training program.

There were several examples of results that have not been reported above. One of these may be worth repeating here. An area manager stated that a worried-looking assistant station manager came into his office and wanted to resign. The assistant station manager had several bald spots on his head. The area manager tried to use non-directive counseling as he had been taught in the training program. He asked the man to sit down. The area manager listened and said very little. Occasionally he said "uh-huh" to show the man he was listening and to encourage him to go on. After approximately forty-five minutes the assistant station manager stood up and thanked the area manager warmly for his help, although this seemed strange to the area manager because he felt that he had not done anything. Several weeks later, the assistant station manager's wife phoned to thank the area manager whom she had never met for the help that he had given her husband. The wife stated that her husband was feeling much better. Furthermore, his hair grew back.

If it can be admitted that this program did cause some changes, one might question why so in this program when no other program has been shown to produce any lasting desirable effects. Granted there have been only two other serious efforts. One was in the International Harvester Company (Fleishman, Harris, Burtt, 1955), and the other was in the Detroit Edison Company (Hariton, 1951). These two previous studies contained more cases and had more clearly quantifiable measures. Perhaps that means that the Western results are positive because the method was less rigorous.

I hope and think otherwise. While the same intimacy of detail is not known about the Harvester and Edison development programs as about the Western Oil Company, there are some aspects of the latter that are different from many company training programs and consequently might explain positive results.

The Western program was carefully planned by the company with the assistance of an outside consultant. There was some preparation for it by an exercise performed prior to coming to Western City. It was planned for the company rather than "canned". The retail supervisors' bosses had had similar and longer training for several steps up the ladder. Three of these higher rungs have been discussed. Additionally there was a fourth manager in the home office who had similar experience. Thus the training began at the top and worked down with each level supporting and reinforcing the training of the subsequent level. Classes were small. Holding the group to twelve allowed a participation that cannot be reached in much larger groups. Line management was tied in in a way to commit the company to the objective of greater participation. Outside consultants were used who added interest and prestige and probably afforded an opportunity for freer discussion.

The fact that the current study is in a marketing organization which is primarily a sales organization may thereby make it an importantly different situation from the Harvester and Edison supervisors who were in production and not sales. A marketing organization with its recognition that "the customer is always right", is perhaps easier to change to the recognition of the importance of people within the organization.

Summary and Conclusions

A management development program has been found to have changed the behavior of retail supervisors back on the job after training. Changes are asserted by the supervisors, by their bosses, and most convincingly, by their subordinates.

Retail supervisors have gained from the management development program more satisfaction from their job. They have often gotten a sense of growth and achievement through greater competence to perform on the job.

The extent of change by the retail supervisors is influenced by their bosses. Division managers who are judged by the home office to be highest in encouraging participation have retail supervisors who have changed more than supervisors under managers at the other end of the scale in encouraging participation.

Primarily the effect of the program was the supervisor's better understanding of the station managers and dealing with them as individuals. The supervisor allowed the station manager to solve his own problems to a greater extent than before and apparently made his own jobs easier thereby as well as raising the morale of the station manager. This did not mean a laissez-faire approach as the supervisor was frequently in touch with the station manager. In fact, the station managers were enthusiastic about the freedom with which they felt they could call on their supervisor for help, and almost unanimously they found the supervisor to be helpful.

Of secondary importance to the retail supervisors as a group, although of primary importance to some, was the introduction of the conference or the problem-solving conference. For some this meant more meetings, but for most it meant not more, but better meetings. Better in the sense that there was more accomplished and that the participants were more enthusiastic about some program of sales or whatever.

The innovation of participation in management resulted from a management development program; it was facilitated if the boss encouraged participation, but was inhibited if the boss did not encourage participation.

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II.

STUDIES OF COMMUNICATION TO THE PUBLIC

EXPERIMENTAL STUDIES OF COMMUNICATIVE EFFECTIVENESS

JUM NUNNALLY

Dr. Nunnally, professor of Psychology at Vanderbilt University, reports on several experiments made as a part of the major investigation of communication and attitudes on mental health, which was the subject of his book, POPULAR CONCEPTIONS OF MENTAL HEALTH.

EXPERIMENTAL STUDIES OF COMMUNICATIVE EFFECTIVENESS

by

Jum Nunnally

It is usually the case in a new science that lawfulness is sought on an oversimplified basis; and, because of the failure to deal with complex interactions between variables, many of the early investigations either fail or produce apparently conflicting results. The study of persuasive communication is presently in this beginning phase. Because of the complexity of variables in many communication situations (such as in propaganda campaigns) there is an unfortunate tendency to forsake experimentation for after-the-fact description. In the long run it will probably be more fruitful to try to measure the more important variables and determine some of the ways in which they combine in human communications.

The purpose of this chapter is to demonstrate experimentally some of the variables that interact in determining the effectiveness of communications. The experiments were done as part of a larger research program concerned with the development and change of popular conceptions of mental health problems. The purpose of the larger research program and some of the major findings will be briefly described in order to place the experiments in context. (1)

Our research project is broadly concerned with the communication of mental health information. There are many places in which mental health information will need to be communicated to the public or to intermediaries between the public and mental health experts. Families will need to know how to help in rehabilitation. Teachers will need to know the signs of mental disorder in young children and what can be done in the classroom and elsewhere to help them. Civic agencies will need to know how to promote favorable community attitudes toward treatment facilities. In these and many other instances the effectiveness of prevention and treatment will depend in large measure on adequate communication.

One approach to communicating with the public would be to have the mental health professionals (psychologists, psychiatrists, social workers, and others) work directly with people who need information and advice. There are some professionals who believe that only direct contact with individuals will bring constructive changes. However, there are not at present and may never be enough professionals to do the job. Even if enough professionals were available, it is possible that other methods of communicating with the public would be more effective for some purposes. Consequently, much of the burden of informing people and promoting constructive changes in attitudes will rest on less direct methods of communication: presentations in the mass media, pamphlets, special films, classroom presentations, group discussions, and others.

The first three years of the project were spent in learning what the general public thinks and feels about mental health issues. The succeeding two years of research were devoted to experimental studies of the transmission of information about mental health and the promotion of favorable public attitudes toward mental health concepts. After summarizing some results from the overall research program, (2) four relevant experiments will be described.

Content classifications: information and attitudes

A primary distinction should be made in communication studies between information and attitudes. Information is what an individual knows, or thinks he knows about an issue. Attitudes concern how the individual feels about objects, persons, or ideas. In this chapter the term information will be used to refer to verifiable statements such as, "There are more men than women in mental hospitals". In contrast, a statement such as, "I am afraid to be around anyone who has had a mental disorder", concerns an attitude, or personal reaction, and as such, is not subject to verification.

Although it is not always easy to make a fine distinction between information and attitudes, the distinction has been very important in our research. It will be shown that in the mental health area information and attitudes obey very different principles.

Measuring instruments

As is usually the case in social science studies, one of the primary stumbling blocks is the lack of adequate methods for measuring important variables. For this reason, some of the effort on our project has been devoted to the invention of measurement methods for particular problems, the construction of questionnaires suited to the study of mental health issues, and the adaptation of general measurement procedures to our kinds of studies.

Measurement of information. In order to measure what the public knows about mental health issues, a special questionnaire was constructed. Rather than invent questionnaire items or borrow them from other studies, items were sampled from popular thinking, mental health professionals, and from the mass media content. Several thousand information statements were collected from personal interviews with members of the general public, (3) mental hygiene textbooks and professional publications, and from a small survey of the mental health content of the mass media of communications. Some of the statements collected in that way were, "Mental illness results from continuous overeating", "The main job of the psychiatrist is to recommend hobbies and other ways for the patient to occupy his mind", and "Mental disorder results from a lack of will power".

The next step was to "boil down" the two thousand opinion statements to a number that could be used in questionnaire studies. Two hundred and forty items were selected which seemed to represent the meat of the larger collection. These were then made into a questionnaire. A seven-point rating scale was provided for each opinion statement, ranging from "agree" to "disagree". The 240-item form was administered to a diverse collection of 349 persons in and around Champaign-Urbana, Illinois.

Sixty of the 240 items were either strongly agreed on or strongly disagreed on by most of the respondents. These 60 items were not used in subsequent analyses. The remaining 180 items were intercorrelated and factor analyzed. (See 8 for a report of the factor analysis and other results from the study of public information.)

Ten factors were found in the analysis. Although the factors are not very "strong", they have been useful in subsequent studies of public opinion. (9, 14) Each factor consists of a number of opinion statements that tend to "go together". That is, if a person agrees with one of the statements, he tends to agree with all of them to some extent; and if a person disagrees with one of the statements, he tends to disagree with all of them.

The results of the factor analysis were used to construct a shorter form of the questionnaire containing the 50 items most representative of the ten factors. This 50-item questionnaire was subsequently used as the major instrument to measure public information in survey work and to measure changes in information in experimental studies.

Measurement of attitudes and meanings. For the measurement of public attitudes toward mental health phenomena, we have relied heavily on a measuring instrument called the semantic differential (see 13 for a detailed description of the measurement technique). The essence of the method is that it allows a subject to rate a concept with respect to sets of bipolar adjectives. An illustration is shown in Figure 1. The concept in Figure 1 is "psychiatrist". Almost anything can be used as a concept, e.g. "peach ice cream", "Marilyn Monroe", "United Nations", "communists", "shock treatment", "Cadillac", etc. In our studies we are interested in ratings of concepts related to mental illness, such as "a mentally ill person", "insane man", "nervous breakdown", "neurotic woman", "mental hospital", "psychologist", "nurse", "psychotherapy". For comparative purposes, we also obtained ratings of concepts such as "my father", "my mother", "me" (the self-concept), "marriage", "old man", "child", and others.

Figure 1

Psychiatrist

Ignorant							Intelligent
Effective							Ineffective
Weak							Strong
Anxious							Calm
Ugly							Handsome
Simple							Complicated
Strange							Familiar

The seven-point rating continuum used for each pair of bipolar adjectives is called a scale. There are two ways in which scales were selected for our studies. First, scales were chosen to incorporate the known factors which have been found in previous studies. There are three well-known factors: (1) evaluation, defined by scales like good-bad, valuable-worthless, and kind-cruel, (2) potency, defined by scales like strong-weak, large-small, and rugged-delicate, and (3) activity, defined by scales like active-passive, fast-slow, and sharp-dull. A fourth factor, understandability, occurs prominently in our studies of mental health concepts. It is represented in our studies by scales like understandable-mysterious, familiar-strange, and predictable-unpredictable. In addition, scales were selected which we thought would have special relevance to mental health phenomena. Some of these were tense-relaxed, clean-dirty, and safe-dangerous.

Summary of Previous Findings

Public information

A series of questionnaire studies (8) shows that the public is not grossly misinformed about mental health issues. Most members of the public reject the superstitions and obvious misconceptions about the causes, symptoms, treatment, and social effects of mental disorder. Also, the average responses obtained from the public are, in most cases, not grossly different from the average responses obtained from psychologists and psychiatrists. (See 8 for some exceptions to the rule.)

There are two groups in the population whose members are, on the average, misinformed. These are people with less than a high school education and people over about 55 years of age. (8) The difference between age groups still holds when statistical corrections are made for the differences in amount of education had by older and younger adults. Although the tendency for older people to hold less correct information is not due to amount of education, it may be due to differences in kind of education. Social science studies are emphasized more now, and it is possible that younger adults tend to discuss mental health and mental illness more than their elders do.

Although, as was said above, the "average man" is not grossly misinformed, he is uninformed about many aspects of mental health and mental illness. The professionals do not know many of the answers, and it is only to be expected that laymen will have even larger gaps in their storehouse of information. Some of the research results indicate more directly that many aspects of mental health and mental illness are complete unknowns to the "average man".

If, as our results indicate, the problem is that of filling in the near void where people are uninformed, it suggests something about the communication job ahead. It is usually found that it is easier to supply people with new information when no competing beliefs are held than it is to convert well-established beliefs. Also, if people are generally uninformed, it should be relatively easy to persuade people to accept new information. The experiments which will be discussed show that this is the case: It is surprisingly easy to get people to accept new information about mental health, even if the information is wrong and grossly oversimplified. (11)

Public attitudes

A series of studies using the semantic differential (12) shows that public attitudes toward the mentally ill are "bad": The mentally ill are generally regarded as dangerous, insincere, foolish, worthless, and so on. The public has slightly different meanings for persons with psychotic and neurotic disorders. Psychotics are viewed as being stronger, more dangerous, and more worthless. Neurotics are viewed as being more tense, weak, and more predictable. The public reacts to all forms of mental illness as being "not understandable", and the lack of understandability seems to be a cornerstone of the distrust, dislike, and fear of the mentally ill. From this, it would be expected that any communication which makes the individual feel that he understands the mentally ill will reduce the negative attitudes, regardless of whether the communication actually increases understanding. The experiments to be discussed indicate that the supposition is largely correct.

Whereas it was found that correctness of information correlates with demographic variables such as age, education, and others, correlations between demographic variables and attitudes toward the mentally ill are small to the point of insignificance. That is, older people and younger people, more-educated and less-educated people, men and women, people of high socio-economic status and people of low socio-economic status, hold approximately the same kinds of negative attitudes toward the mentally ill.

Subject-matter characteristics

Studies of persuasive communications must take into account some natural features of the subject matter to be communicated. One of our efforts has been to measure some of the characteristic ways in which people react to messages about mental health issues.

Terminology. One of our findings is that the popular vocabulary available for discussing mental health and mental illness is quite limited. For example, only a few terms are available for discussing various forms of mental illness. Some of these are "insane", "neurotic", and "nervous breakdown". Although there is a rich slang, populated with terms like "nuts", "bats", and "headshrinker", the terms are not appropriate for use in future communication programs. The shortage of terms places a limitation on the scope of communications used in experimental studies and an even more serious limitation on practical programs of communication with the general public.

Many of the terms which the public uses have "built-in" attitudes which are fixed and near immovable. For example, the public reacts uniformly with negative attitudes toward the concept "insane person", and, in experimental studies, we find it very difficult to obtain positive changes in attitudes. Consequently, favorable attitude changes are obtainable only by switching to less attitudinally fixed terms, such as "mental patient" and "emotional illness".

Many of the terms used by the public suggest misleading explanations of mental disorders. For example, the term "neurotic" suggests anxiety and overemotionality, and consequently, it is difficult for the public to think about neuroses in which the symptoms are torpidity and shallowness of feeling. These associated explanations limit the kinds of changes in meaning that are obtainable in persuasive communications about mental health problems.

Message anxiety. One of the crucial variables that must be reckoned with in communicating mental health information is the anxiety usually engendered by the topic. From a variety of studies, we have found that people tend to become "tense" when they read about, or in other ways receive communications about, mental disorder, mental hospitals, neurotic symptoms, psychiatric practices, and related matters. To illustrate one kind of evidence for the "anxiety", when people are asked to rate communications about mental illness, they usually rate them as somewhat disturbing and frightening. We have found that the "anxiety" associated with the topic of mental illness has a great deal to do with the effectiveness of communications, and a number of our experiments were specifically designed to find how the "anxiety" interacts with other communication variables.

Public interest. Communication programs are of little avail unless the public is sufficiently interested to read about the topic or see and hear presentations relating to the topic. A questionnaire-study (7) indicates that the public is moderately interested in mental health and mental illness topics as a whole. More important, the public interest varies widely with different kinds of mental health issues. Public interest is highest concerning immediate personal aspects of the problem -- how to recognize mental illness in its incipient stages, what can be done to handle the immediate problem in the home, and whom to seek for help. Public interest in long-range issues and broad social problems about mental health is low. For example, topics such as the following receive very low interest ratings: community planning of mental health facilities, helping mental patients to move back into society, and the effect of emotional disorder in industry. Public interest seems to be dominated by a need to learn the danger signals and how to avoid the problem or seek help.

The results of the questionnaire study suggested an experiment to learn more about public interest in mental health issues. In the experiment we tested the effect of three message variables on public interest. The first variable was "message anxiety", the extent to which the message portrays pain, fear, and embarrassment. The second variable was the degree to which the message offers a solution to a problem. The third variable was the degree to which the message elicits identification between the subject and the persons and events which are described (see 4 for a more detailed description of the research).

In the experiment, short written messages were composed about treatment of the mentally ill. The messages were structured in such a way as to contain all possible combinations of the three message variables. That is, one message had relatively high anxiety, a personal approach, and offered no solution to the problem discussed. Another message had relatively little anxiety, an impersonal approach, and offered a solution. (The complete experimental design required an elaborate Latin-square structuring of eight topics and eight message variable combinations.)

Subjects were given sets of the messages and asked to rank them in terms of "what they would like to learn more about". The results of the study are quite clear. Anxiety tends to depress public interest in mental health topics. When message anxiety is accompanied by both no solution and a personal approach, the public interest is very low.

Study 1: Contact with the Mentally Ill

It is often supposed that if people had more face-to-face contact with the mentally ill and with those who have recovered from mental illness, that much of the stigma would be alleviated. For this reason it has been proposed that the general public be encouraged to visit mental hospitals and meet the patients first-hand. Also, a trend in public information programs, such as in TV presentation, is to introduce current or former mental patients and have them discuss mental illness and treatment.

Before more extensive use is made of "contact" with the mentally ill as an aid to communication, it is important to determine whether or not "contact" actually has the desired effect. The experiment which will be described concerns one aspect of the "contact" issue, the differential effectiveness of messages when the sources are identified as former mental patients versus being identified as "normal" persons. In essence, what was done in the experiment was to give a standard message to different groups of subjects; and in some groups the message was identified with a "former mental patient" and in other groups the message was identified with a "normal" person. Then tests were made to determine the differential effectiveness of the presentations in changing information and attitudes. (Actually, the experiment was considerably more complicated than this, and provision was made for testing the effect of other variables in addition to "contact".)(4)

Method

A standard twenty-minute lecture was given by two women to a number of groups of high school students. Each speaker gave the talk under three different conditions, to three different groups of students. In the first condition, the speaker mentioned at the beginning of the talk that she was a "former mental patient", (5) had received treatment, and had benefited considerably. In the second condition, the speaker mentioned having been a mental patient at the end of the talk only. In the third condition, no mention of having been a mental patient was made. Both women speakers performed under all three conditions, in different orders. Each speaker applied each condition to two different groups of students.

The 20-minute talk was intended to impart some general information about the causes, prevalence, and treatment of mental disorder. The tone of the talk was generally optimistic, and an effort was made to convince the listeners that scientific advances in the future will lead to a better understanding and control of mental disorder. The talk was written by the experimenter and memorized by the two speakers.

The 20-minute lecture was given during the regular class periods. Students had been told in advance only that someone would give a talk about mental illness. Otherwise they were told nothing about the speakers and were given no indication that an experiment would be done.

In order to measure the effectiveness of the talk under the three conditions, the information and attitude forms discussed previously were applied. Both the 50-item information questionnaire and a semantic differential form were administered three days after the talk. The semantic differential contained scales to measure the four factors of evaluation, potency, activity, and understandability. Concepts relevant to mental illnesses were employed, such as "psychiatrist", "mental patient", "mental hospital", and others. The information and attitude measures were administered by different persons than those who participated in the talks, and an effort was made to dissociate the talks and the measurement instruments.

Results

The design of the experiment was sufficiently complicated to provide an overabundance of analyses, including interactions of speakers with particular kinds of information and attitude changes. Here we will discuss only some of the more gross results that relate to the effectiveness of "contact" as a variable in communications.

The 20-minute talk had a marked effect on answers to the 50-item information form. The students who heard the talk by either speaker and in any one of the three conditions gave grossly different responses from students in the control groups (students who were not given the talk). Consequently, in all three conditions, the 20-minute lecture proved very effective in changing information.

The three treatment conditions (contact-before, contact-after, and no-contact) did not differentially affect answers to the information questionnaire. In other words, all three methods of presentation had a strong effect on information, and they were about equally good.

Whereas the three treatment conditions had about the same effect on information, they had significantly different effects on attitudes (see Table 1). The talk produced the most favorable attitudes when the speakers mentioned being former mental patients at the *end*. Next most effective was the condition in which no mention was made of being a former mental patient. Least effective was the condition in which the speakers mentioned that they were former mental patients at the *beginning* of the talk.

Discussion

The results lend support to what was said previously about public information. They suggest that, at least for high school students, people are unsure of their information, are sufficiently anxious about the subject to want to know more, and will readily accept any factual and authoritative-sounding information.

The results should be a warning to anyone who supposes that contact with the mentally ill necessarily promotes favorable attitudes toward the mentally ill. Of course, we investigated only one way in which contact might be important. However, we find that if contact is to be employed in terms of who acts as source for messages, then it is apparently important how the contact is handled. Our results indicate that if the speaker is to identify himself as being or having been mentally ill, it is far better to do it after the substance of the message has been delivered. If the identification is done at the start of the talk, it may actually have a harmful effect on attitudes toward the mentally ill. Our hypothesis is that early identification allowed the subjects to discount the speaker and, hence, via pressure toward congruity or consistency, to offset the influence of the talk on attitudes toward the mentally ill.

Table 1

Mean* Attitude Ratings toward the Concept "Ex-Mental-Patient" by Three Differently Treated** Groups of High School Students

Group	Early contact (94 students)	Late contact (94 students)	No contact (94 students)
Mean attitude rating	4.54	5.29	4.80

*Ratings were made on seven-point scales, averaged over 5 evaluative scales for each individual, and then averaged over the 94 students in each treatment group.

** All three groups received essentially the same message. In the early contact group, at the beginning of the talk the speakers told their respective audiences that they were former mental patients. In the late contact groups, the speakers waited until the end of the message to say that they were former mental patients. In the no-contact group, no mention was made of being a former mental patient. The late contact group shows a significantly (.01 level) more positive attitude than the no-contact group. The no-contact group has a more positive mean attitude than the early contact group (difference significant at the .05 level).

Study 2: Message Anxiety

Previously, it was said that mental health information tends to create anxiety. In this section an experiment will be described which indicates some relationships between anxiety and communicative effectiveness.

Before describing the experiment, it is important to make a distinction between two uses of the word anxiety. The term message-anxiety will be used to refer to the relative amount of physical danger, violence, and embarrassment reported in the message. This use of the word anxiety relates only to obvious features of the message and does not necessarily concern how people react when receiving the message. The term anxiety reaction refers to an emotional response. In a number of studies we have found that mental illness topics tend to induce an anxiety reaction regardless of how the topics are treated. In the experiment to be described we studied the interaction of the general anxiety reaction to mental illness topics with two levels of message-anxiety. That is, we took a topic (mental illness) which usually induces an anxiety reaction, and then treated it in two ways. One treatment was to make the message have a lot of message-anxiety, by discussing a considerable amount of physical danger and embarrassment. The other treatment was to avoid mention of physical danger and embarrassment. We then studied the effectiveness of the two kinds of treatment in changing attitudes and imparting information.

Method

The larger experiment, (6) from which the present results will be extracted, concerned issues in addition to message-anxiety and also concerned topics other than mental illness. Here will be reported only those results which concern the relationship between levels of message-anxiety and the effectiveness of communications about mental illness.

The mental illness message used in the study consisted of a one-page description of "shock" treatment and psychotherapy. The purpose of the message was to impart a few facts about the treatment of mental illness. Two forms of the message were composed: one with relatively high message-anxiety and one with relatively low message-anxiety. The two versions differ with respect to twenty words and phrases. For example, the "high" message described a patient as being "carried into the room and tied into position"; whereas the "low" message read "brought into the room and placed in a restful position". Other than for these relatively slight differences, the same basic facts were presented in both versions.

The experiment was conducted on high school students. Ninety-six students were randomly divided into two groups of forty-eight each. The members of one group read only the high-anxiety mental illness message. The members of the other group read only the low-anxiety version.

After the messages were read, some tests were made to determine the differential effectiveness, if any, of the versions. To measure the effect of the two versions of the message on attitudes, a special form of the semantic differential was used. Scales were employed to measure the evaluative and understandability factors. In addition, a number of other scales were included to measure "threat", such as dangerous-safe, tense-relaxed, and risky-secure. The scales were applied to the concepts "psychiatrist", "mental hospital", "mental patient", "methods for treating mental patients", and others.

In addition to the use of the semantic differential, a short reading comprehension test was used. The test consisted of multiple-choice questions about the substance of the experimental message. The test was used to determine whether or not the high or the low "anxiety" version of the message produced more retention.

Results

The high and low message-anxiety versions apparently did produce a different amount of anxiety reaction. The group that received the high message-anxiety versions rated the concepts "me" and "the message which you have just read" as more anxious. The mean differences are significant beyond the .01 level by t-test.

In terms of evaluation, the two versions were not differentially effective. That is, on scales like valuable-worthless and good-bad, the "high" and "low" message-anxiety groups did not give significantly different ratings of "psychiatrist", "mental patient", "mental hospital", and others.

In terms of the understandability factor, the "high" and "low" versions produced highly significant differences. That is, on scales like understandable-mysterious and predictable-unpredictable, the group that received the high message-anxiety version gave higher ratings of concepts like "psychiatrist", "mental patient", and others. The results are shown in Table 2.

The results from the additional scales used on the semantic differential help clarify the results obtained from the evaluative and understandability factors. The additional scales show that the group which received the high message-anxiety version rated "psychiatrist" and "mental patient" as more dangerous and anxious. The mean differences between the groups receiving the two versions of the message were significant beyond the .01 level by t-test.

From the reading comprehension test we learned that the mean difference in retention by the high message-anxiety group and low message-anxiety group is not significant. In other words, the two groups learned about the same amount from their respective versions of the message.

Discussion

The results must be looked at carefully in order to prevent misinterpretation. In terms of the purely attitudinal dimension, evaluation as measured by the semantic differential, the two levels of message-anxiety, and the corresponding difference in anxiety reaction to the two versions, had little if any effect. However, the group that received the higher anxiety message rated mental illness and treatment concepts as more understandable. This appears to indicate that anxiety had a "good" effect.

Table 2

Mean* Understandability Ratings for
High Anxiety and Low Anxiety Groups

Concept	Group receiving high anxiety version	Group receiving low anxiety version
Methods for treating mental patients	4.65	4.33
Mental hospital	4.65	4.34
Psychiatrist	4.88	4.46
Mental patient	2.76	2.65

* The means were obtained by averaging over 3 understandability scales for each person and then averaging over the members of each group.

Before the conclusion is accepted that anxiety had a beneficial influence on the subjects, a number of other aspects of the results should be considered. The group that received the high message-anxiety version was more prone to rate the mentally ill and treatment procedures as risky and anxious. In other words, the message-anxiety generalized to the concepts in the message, which, from a practical point of view, is undesirable.

Another point that should be considered is that even though the group that received the high message-anxiety version indicated that mental illness and treatment concepts were more understandable (relative to the low message-anxiety group), it is improbable that they could have really obtained more understanding. As was said earlier, the two versions of the message were almost identical, except for small changes in wording. Also, the two groups did not differ significantly on the comprehension test.

How do these different results tie together? Our present interpretation is that the high message-anxiety version induced a need for "closure" about mental illness and treatment. Consequently, the group that received the high anxiety message responded as though a real (but actually unrealistic) increase in understanding had occurred. Along with the "head in the sand" attitude developed by the high anxiety version, the group generalized the anxiety in the message to the concepts which were discussed ("mental patient", "psychiatrist", etc.). If this interpretation is borne out by future studies (some are presently under way on our project), the conclusion will be that message-anxiety is "bad" in communications about mental illness because (a) as was discussed previously, it lowers the public willingness to receive communications, and (b) as the present results indicate, it has, in part, an undesirable effect on attitudes toward mental illness concepts.

Study 3: The Destruction of Information

The research results described up to this point indicate that the public is somewhat anxious when receiving communications about mental illness (and, perhaps, anxious when thinking about mental illness). Also, when people learn something about mental illness, or think that they do, the anxiety associated with the topic, and the fear and distrust of the mentally ill, are reduced. From these principles it was reasoned that communications which destroy existing public information, and provide no new information in return, will increase the popular fear and distrust of the mentally ill (and also of the people and institutions that treat the mentally ill). In other words, if you tell an individual that his information about mental illness is incorrect, and do not tell him what is correct, it will promote negative attitudes toward concepts like "mental patient", "psychiatrist", "mental hospital", and others.

It would be rather difficult to directly test the hypothesis that the destruction of existing public information leads to "undesirable" attitudes toward mental health concepts. Instead, what we did was to perform an experiment which is closely related to the hypothesis. In the experiment, subjects were asked to read short written messages about mental illness. At the end of the message, subjects were told that the material reported in the message was wrong. In other words, we gave people information in the body of the message and then "destroyed" the information at the end of the message. Measures were then made of attitudes toward the mentally ill and toward mental health professionals and treatment methods. The results were compared with measurements made on control groups.

Method

Two experimental and two control groups with thirty persons in each were used in this study. Subjects were randomly assigned to the four groups. All subjects were undergraduate students at the University of Illinois.

Both of the experimental groups read one-page written explanations of catatonic schizophrenia. One group was given a psychogenic explanation and the other experimental group was given a physiogenic explanation.

The two control groups read one-page written messages about topics not concerned with mental illness. One control group read about "The Great Barrier Reef" and the other control group read about the use of the typewriter.

The two mental illness messages were ones that had produced "favorable" attitude changes toward mental illness concepts in previous studies. The full body of the physiogenic explanation was as follows:

> Some of the bizarre forms of human behavior which we refer to as insanity have been difficult for scientists to understand. A particularly baffling mental disorder is catatonic schizophrenia. The individual sits motionless, staring straight ahead, and is completely out of contact with his environment. He will not respond when spoken to and will not move even if the building around him is on fire. Some patients spend the rest of their lives living more like a stone than a human being.
>
> Recent scientific findings indicate how catatonic schizophrenia develops and what can be done to cure it. It is now known that the disease is caused by a chemical substance in the blood. A copperish substance has been found in the blood of these patients which occurs to a much less extent in normal people. When normal persons are injected with the substance, they show the catatonic reaction in a few minutes time. Their behavior is identical to real mental patients. After about an hour they return to normal.
>
> There are two important consequences of this recent discovery. First, the seemingly odd and mysterious behavior of the patient is now seen as an understandable reaction. We no longer have to invent complicated explanations of what seemed like mysterious behavior. Second, the discovery points to a cure for the disorder. The patient is given medicines to reduce the copperish substance in the blood. After several weeks of this treatment the catatonic symptoms go away. Along with the administration of drugs, the patient is given a series of therapeutic interviews. He is invited to talk over his difficulties and is advised about the problems that will be encountered on returning to society. Patients who undergo this treatment often show marked improvement. Many such persons are now back in society leading happy, productive lives. The progress that has been made with this one type of mental illness gives promise that all forms of insanity will be both understandable and curable in the decade ahead.

If we had used the two experimental messages as they came from previous studies, they would probably have produced "favorable" attitude changes. However, we altered the two experimental messages slightly in order to provide some information relating to the hypothesis discussed above. The two experimental messages were altered in only two places. First, the two messages were introduced with the written statement: "The following article appeared several years ago in a magazine." Second, the two messages ended with the written statement: "Research completed since this article was written tends to refute the explanation. It now seems that the cause of the disorder and the method of treatment as stated above is not as effective as was previously supposed."

After the two experimental and two control groups read their respective messages, a semantic differential form was used to measure attitudes toward mental illness concepts. The form contained scales for the evaluative, potency, activity, and understandability factors, and employed concepts like "psychiatrist", "mental patient", and others.

Results

Table 3 shows the mean evaluation ratings of mental illness concepts and the concept "me" for the experimental and control groups. Table 4 shows the mean understandability ratings of the concepts for the experimental and the control groups. The differences between the means for both Tables 3 and 4 are small; but, with one exception, they are all in the predicted direction. The experimental groups give lower evaluations of the concepts than the control groups. The exception is that the experimental group gives a higher evaluation of "person who has catatonic schizophrenia", but the difference is not statistically significant. Adding together the four mental illness concepts in Table 3, the grand means are significantly different beyond the .05 level by t-test.

In Table 4 all of the differences are in the predicted direction. The grand means on the four mental illness concepts are significantly different beyond the .01 level by t-test.

Even the concept "me" follows the same pattern as the other concepts. Although the differences between experimental and control groups on evaluation and understandability are not statistically significant when treated separately, when they are averaged over both evaluation and understandability, the between groups mean difference is significant beyond the .05 level by t-test.

Combining the results of the evaluative and understandability factors, in nine out of the ten comparisons the control group gives more "favorable" ratings than the experimental group. Even looking at it in this raw way, the difference between the two treatments is significant beyond the .05 level by sign-test.

Discussion

The results support the hypothesis that the "destruction" of information, without supplying new information, results in negative attitudes twoard the mentally ill, toward the people who treat the mentally ill, and toward treatment

Table 3

Mean Semantic Differential Ratings* on the Evaluative Factor for Various Concepts

Concepts	Experimental groups	Control Groups
Psychiatrist	5.89	6.12
A person who has catatonic schizophrenia	4.02	3.72
Mental patient	3.87	4.22
Treatment of mental illness	5.54	5.81
Me	5.64	5.92

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* Ratings were averaged over the two experimental groups separately and over the two control groups separately. Thirty subjects were in each experimental and control group. Consequently, each mean is based on 60 cases. Scales like valuable-worthless and sincere-insincere were combined to form the evaluative factor. The means are shown to the same scale used for the seven-step semantic differential ratings. A mean of 4.00 means "neutral". A mean above 4.00 indicates a positive attitude. A mean below 4.00 indicates a negative attitude.

Table 4

Mean Semantic Differential Ratings* on the Understandability Factor for Various Concepts

Concepts	Experimiental Groups	Control Groups
Psychiatrist	3.76	3.88
A person who has catatonic schizophrenia	2.90	3.36
Mental patient	2.16	2.53
Treatment of mental illness	2.99	3.53
Me	3.87	4.08

---

* Ratings were averaged over the two experimental groups separately and over the two control groups separately. Thirty subjects were in each experimental and control group. Consequently, each mean is based on 60 cases. Scales like understandable-mysterious and predictable-unpredictable were combined to form the understandability factor. The means are shown to the same scale used for the seven-step semantic differential ratings. A mean of 4.00 means "neutral". A mean above 4.00 indicates a positive attitude. A mean below 4.00 indicates a negative attitude.

methods. The results illustrate the unfortunate results of telling people only what does not cause mental illness, how the mentally ill do not act, and what does not serve to cure mental illness.

Interestingly enough, the "destruction" of information about mental illness apparently affects attitudes toward the self-concept. It leads people to devalue themselves and to consider themselves less understandable. The differences in the present study are small and only barely significant by statistical test. However, we have found the same small but consistent differences in related studies. This illustrates how mental illness topics generate anxiety, and how, without information or when information is "destroyed", the anxiety is reflected in the self-concept.

Study 4: Independence of Attitude and Information Changes

All of our studies show that it is very easy to change popular information about mental illness topics. (For example, we were surprised to find that one-page written messages, such as the one shown previously, produced marked changes on our 50-item information form.) Following the changes in information, "constructive" changes in attitudes occurred. It became apparent that relatively similar attitude changes, as measured by the semantic differential, were obtained from messages which said very different things. That is, a message about psychotherapy has about the same beneficial effect on attitudes toward the mentally ill as does a message explaining the causes of neurosis. It was conjectured that the essential ingredient in the promotion of favorable attitudes is for people to think that they are learning something about mental illness, and that it matters little what they "learn" (as long as it is related to the central topic of mental illness). More specifically, the hypothesis is that the amount of information given subjects is a more important determiner of amount of "favorable" attitude change than is the kind of information given subjects. A study will be described which, in part, tests the hypothesis.

Method

Whereas the previous three studies described were experiments, the study to be described in this section is best thought of as an exploratory investigation. Rather than try to change peoples' information and attitudes, we measured the changes that "naturally" occur in high school mental hygiene and psychology courses. The purpose was to discover some general principles of attitude and information change, and interactions between the two kinds of changes, which could be tested later in controlled experiments. In addition to serving an heuristic purpose, the high school studies produced some interesting findings of their own.

The standard procedure in the high school studies was to administer the information and attitude measures during the first week of the semester and again during the last week. The students were told almost nothing about the purpose of the measures, and, on being tested the first time, they were not told that repeat measures were to be taken at the end of the semester. The measures were described to the students as "part of a university research project", and a careful effort was made to dissociate the measures from the "psychology" course material.

Information was measured with the 50-item form described earlier. A point that was not mentioned previously about the information questionnaire is that 10 of the 50 items can be used as a "test" of information correctness. The 10 items are ones on which psychologists and psychiatrists are in good agreement, and on which there is considerable diversity of public opinion.

Attitudes were measured with the semantic differential. Scales were included to measure the four factors described previously, and concepts such as "neurotic man", "psychiatrist", "me", "my mother", and others were employed.

Measures were taken at three different schools widely spaced in Illinois. From two to six sections of students were tested at each school. The combined results from two of the schools will be discussed here.

Results

In both schools changes from "before" to "after" on the information form were marked. Some illustrative changes for one school are shown in Table 5. Of the 50 before-after mean differences in one school, 32 were significant beyond the .01 level by t-test. Twelve of the remaining 18 differences were significant beyond the .05 level. The over-all amount of change in the two schools was not significantly different. In other words, almost all of the information items changed and the amount of change in the two schools was approximately the same.

In spite of the similar amounts of change in the two schools, the kinds of changes in the two schools were very different. The correlation between the two sets of 50 change scores is not significantly different from zero.

Another point to make about the information changes is that, as measured by the information "test", neither group showed a marked improvement in "correctness" of information. As a matter of fact, the test results show that one group became slightly more "correct" and the other group became slightly less correct.

Although different kinds of information changes occurred in the two schools, approximately the same kinds of attitude changes occurred. Illustrative changes in one school are shown in Table 6. The correlation between semantic differential changes with respect to mental illness concepts in the two schools is .78. Also, the average amount of attitude change was not significantly different in the two schools.

Table 5

Illustrative Changes in Information During
One-Semester High School Courses in Mental Hygiene*

Opinion statement	Before mean**	After mean
1. Most of the people in mental hospitals speak in words that can be understood.	4.06	3.63
2. More women than men have nervous breakdowns.	4.41	4.11
3. Books on "peace of mind" prevent many people from developing nervous breakdowns.	4.67	5.19
4. Men worry more than women.	4.09	3.17
5. Most clergymen will encourage a person with a mental disorder to see a psychiatrist.	5.56	4.43
6. If a person concentrates on happy memories he will not be bothered by unpleasant things in the present.	3.59	3.20
7. Physical exhaustion does not lead to a nervous breakdown.	4.18	3.67
8. The adult who needs a great deal of affection is likely to have had little affection in childhood.	3.27	4.28
9. Feebleminded children are less obedient than normal children.	4.08	4.16

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*The 20 information statements shown here were the first 20 items appearing in our questionnaire. Of the 50 items in the questionnaire, 32 of the before-after differences were significant beyond the .01 level.

**A mean of 7.00 indicates an average complete agreement with the statement. A mean of 1.00 indicates an average complete disagreement with the statement. A mean of 4.00 indicates an average neutrality about the truth of the statement. Three classes at the same high school were used in this study. The "before" means are based on the responses of 78 pupils and the "after" means are based on 75 pupils.

Table 5 (cont.)

	Opinion statement	Before mean	After mean
10.	Physical rest will not prevent a mental disorder.	5.01	3.95
11.	The brains of the feebleminded are smaller than those of normals.	3.51	3.13
12.	The main job of the psychiatrist is to recommend hobbies and other ways for the mental patient to occupy his mind.	3.19	4.44
13.	There is not much that can be done for a person who develops a mental disorder.	4.26	3.37
14.	Adult problems are less important in causing emotional disorders than the individual's childhood experiences.	2.62	2.84
15.	Most people who "go crazy" try to kill themselves.	3.69	3.51
16.	Few of the people who seek psychiatric help need the treatment.	4.74	3.59
17.	Most people can recognize the type of person who is likely to have a nervous breakdown.	3.51	3.73
18.	If a child is jealous of a younger brother it is best not to let him show it in any way.	4.79	4.48
19.	The main job of the psychiatrist is to explain to the patient the origin of his troubles.	4.41	5.39
20.	Psychiatrists have to have a good sense of humor in order to help their patients.	3.28	3.48

Table 6

Illustrative Changes in Attitudes During One-Semester Courses* in Mental Hygiene (Average** Semantic Differential Rating at the Beginning and End of the Semester)

	Concepts							
	Neurotic woman		Insane man		Psychiatrist		Average man	
Scales	Before	After	Before	After	Before	After	Before	After
Foolish-Wise	2.42	2.95	2.34	2.32	6.18	6.45	5.44	5.44
Ignorant-Intelligent	3.28	3.68	2.86	2.93	6.42	6.70	5.54	5.73
Sad-Happy	2.98	3.01	2.81	2.89	5.10	5.67	5.91	5.94
Passive-Active	3.76	3.71	3.31	3.26	5.80	6.23	6.20	6.14
Insincere-Sincere	3.20	3.41	2.96	2.92	6.18	6.52	6.11	6.04
Poor-Rich	3.62	3.84	3.70	3.71	5.59	5.69	4.20	4.45
Unpredictable-Predictable	2.66	2.53	1.92	1.78	4.98	5.15	5.09	4.89
Weak-Strong	2.61	3.10	3.41	3.78	5.38	5.77	5.96	6.07
Slow-Fast	3.20	3.32	3.41	3.56	4.71	4.90	5.32	5.51
Delicate-Rugged	3.71	3.51	4.54	4.78	4.26	4.59	5.30	5.66
Cold-Warm	3.80	3.70	3.36	3.29	5.24	5.81	5.69	5.64
Dirty-Clean	4.39	4.93	4.36	4.27	6.42	6.67	6.21	6.44
Dangerous-Safe	3.39	3.89	2.35	2.71	6.15	6.56	6.02	6.10
Tense-Relaxed	2.36	2.62	2.36	2.18	5.85	6.37	5.08	5.63
Worthless-Valuable	3.56	4.29	3.81	3.97	6.36	6.64	6.04	6.44
Sick-Healthy	2.35	2.56	1.66	1.68	5.78	5.99	5.81	5.86
Bad-Good	3.64	4.30	3.70	3.64	6.06	6.59	6.02	6.23

* The same three classes were used in this study as were used in the study shown in Table 5. "Before" means are based on 78 cases, and "after" means are based on 75 cases. Note that mean differences here for attitudes are generally smaller than those shown in Table 5 for information. Whereas about two-thirds of the "information" differences were significant beyond the .01 level, differences of that significance among "attitudes" are the exception rather than the rule.

** A mean rating of 1.00 indicates an average response which is like the adjective on the left. A mean response of 7.00 indicates an average response completely like the adjective on the right. A mean response of 4.00 indicates neutrality between the two polar adjectives. For example, "neurotic woman" is rated "before" at 2.42 on the foolish-wise scale, which indicates an average response of somewhat foolish. The mean response changed to 2.95 on the "after" ratings, and, consequently, the change is toward viewing "neurotic woman" as less foolish.

Discussion

Rather than changing in any systematic manner, information seems to have been scrambled from the beginning to the end of the semester. Out of the near chaotic information changes, and different changes in the two schools, came systematic and similar changes in attitudes. It appears that merely taking on new information leads to constructive attitude changes, regardless of what the new information is and regardless of whether the new information is correct or incorrect.

The loose connection shown here between attitude changes and kinds of information changes might be due to the use of high school students. However, we have evidence of a related nature from college students, special groups in the general population, and broad segments of the general population. There we find that very different kinds of message contents all lead to approximately the same kinds (but not always amounts) of attitude changes. The changes are in the direction of regarding the mentally ill as less worthless, insincere, and dangerous, and of regarding treatment methods and treatment specialists as more effective and safe.

Summary

The chapter describes some of the variables that contribute to the effectiveness of communications about mental health and mental illness. Some of our studies concern existing public information and attitudes, and others concern the most effective ways of changing information and attitudes. From the former type of study, it is found that the public is not grossly misinformed about mental illness topics. Instead, the public is uninformed about many of the issues.

Our studies show that it is relatively easy to convey new information about mental illness. Any seemingly authoritative and comprehensible information will be accepted by the public. Attitudes are more difficult to change, but they can be changed.

One of the facts that must be considered in changing attitudes toward mental illness concepts is that the public is somewhat "anxious" when discussing mental illness or receiving communications about the topic. People are more willing to receive communications when the anxiety-provoking features are diminished. If people do receive communications and the anxiety-provoking features are not diminished, it results in adverse attitudes toward mental illness concepts and also leads to a premature "closure" about relevant issues.

Because of the anxiety associated with mental illness topics, and because people are unsure of their information, there is a strong need to learn the "real facts". Consequently, people accept new information readily. After accepting new information, regardless of whether or not the information is valid, the fear of mental illness and the mentally ill is reduced. Our studies suggest that the mere act of acquiring information leads to "constructive" changes in attitudes. Conversely, when people "lose" information, when information is destroyed by counter-arguments, the fear and distrust of the mentally ill and of the professionals who treat the mentally ill are increased. Unless a valid and understandable body of information can be given in return, it may be unwise to destroy existing public misinformation.

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1. The project is sponsored by a special grant from the National Institute of Mental Health, U.S.P.H.S. Wilbur Schramm was project director during the first two years of research. J. C. Nunnally and C. E. Osgood are presently co-directing the research. Persons who served on the project staff during one or more phases of the research are G. Gerbner, T. Husek, G. Suci, P. Tannenbaum, E. Ware, and R. Wolf. A special word of appreciation goes to Joseph M. Bobbitt, Assistant Director, N.I.M.H., for his advice and encouragement throughout the research period.

2. In some cases the research results which are mentioned are presented in detail in the references cited. In other cases, it will be necessary to mention research results which are not yet published. A summary of all of the project research is presently being placed in book form.

3. For the use of materials employed in the sampling of items, we would like to thank, among others, Dr. Angus Campbell, Dr. John Clausen, Dr. Elliot Freidson, and Dr. Shirley Star.

4. The study was designed and executed by T. R. Husek, who is presently preparing a full report of the research for journal publication.

5. The speakers were "former mental patients" only in the sense that they had received psychological counseling during their college training. Neither had ever suffered a mental illness, and both are quite "normal" appearing persons.

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MASS MEDIA CENSORSHIP AND THE PORTRAYAL OF MENTAL ILLNESS: Some Effects of Industry-Wide Controls in Motion Pictures and Television

George Gerbner *and* Percy H. Tannenbaum

Why do television and films present mental health and illness as they do? Dr. Gerbner, who is assistant professor in the Institute of Communications Research at the University of Illinois, and Dr. Tannenbaum, who is director of the Mass Communications Research Center at the University of Wisconsin, sought answers to that question by interviewing key members of those industries and studying some of the controls on the industries.

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MASS MEDIA CENSORSHIP AND THE PORTRAYAL OF MENTAL ILLNESS

Some effects of industry-wide controls in motion pictures and television

by

George Gerbner

and

Percy H. Tannenbaum

The broadest avenues for the diffusion of scientific ideas to the public are the public arts. Our report is about the traffic cops and their effects on the movement of ideas and images about mental illness along two of these avenues -- movies and television. (1)

Censorship, as we shall use the term, is not necessarily synonymous with all its general public meanings and connotations. It is a set of industry-wide controls regulating the nature of commercial cultural commodities primarily in the light of public relations and marketing considerations. The official term for these controls is "self-regulation"; but the more common industry term "censorship" distinguishes between controls by writers, editors, producers, publishers, or other industry executives, and those exercised by specially appointed "gatekeepers" whose main function is to scrutinize and "service" all output in respect to the enforcement of some public relations, moral, and marketing specifications.

The formal specifications guiding the functions of censorship in motion pictures and broadcasting are embodied in the codes. The informal working assumptions, arrangements, and operations will be examined in terms of the administration of the codes, and the over-all functioning of censorship, and the patterns of its "gatekeeping" activities.

Our present slice in the mass media policy-forming process is a narrow one. Although within its microcosm it does reflect significant aspects of the total process, it needs to be placed into the perspective of our larger study of communications and mental illness.

The entire project undertook to study ways of changing popular conceptions about mental health and mental illness. (2) In order to understand what such conceptions were and how they changed, it became necessary to investigate everyday cultural sources of these images, and the context of mass communications which developed and nourished them. This led to a preliminary analysis of the mental health content of the mass media, (3) and to a comparison of expert views and public ideas with mass media presentations. (4)

The image of mental illness in the mass media was found, on the whole, far removed from both expert and public conceptions held by the populations studied. Instead of "mediating" between science and the general public, the "media image" might be expected to "pull" public ideas away from expert views in the direction of bizarre, sordid, fearful, or frivolous portrayals of the subject.

This is a serious problem for all concerned with the public diffusion of new and more enlightened ways of looking at human behavior. The "mass media phase" of the research undertook a three-pronged approach to the problem. The research consisted of (a) 142 scheduled interviews with professionals and executives in positions relevant to our subject, mostly in New York, Chicago, and Los Angeles; (b) more intensive content analysis in all media; (c) field studies of control functions, documents, records, files, memoranda, and inter-office correspondence dealing with all aspects of the policy-making and selection process relevant to our subject, and (d) case studies of certain productions.

The entire project is now in the process of summarization. Our further analysis of mass media content revealed widely divergent types of portrayals of mental illness, designed for different types of markets and audiences. Other studies indicate that the internal needs of the media, the presumed requirements of some dramatic formulas, and the pressures of specific markets all contribute to making mass-produced images of mental illness fit specifications other than the views of experts or even only the general public.

Our particular focus for inquiry here is: what is the specific contribution of internal media censorship to the portrayals of mental illness in motion pictures and broadcasting?

In reporting our explorations of that question, we shall rely on evidence found in the records of censorship operations we had opportunity to examine, supplemented by such observations derived from field studies and interviews as seems necessary to place the documentary material in perspective. In consideration for the people, interests, and confidences involved in all this material, we mention no names, titles, or organizations unless already a matter of public record, and even then only if such mention will not make identification of others possible through the process of elimination.

Motion Picture Industry Censorship

The fear of government censorship is a primary reason for the existence of all mass media codes and self-censorship. As in fighting fire with fire, there is a significant difference between the apparently similar functions of a government censor and those of an industry-appointed censor.

A government censor may be guided by political, moral, scientific, national or any other considerations that reflect the wishes of those who appoint him. An industry censor is paid first and foremost to help protect the interests of the industry, to cultivate its publics, and to preserve its markets. His function is similar to radar guiding a fleet. It is to spot storm and trouble ahead, to help calculate the paths of least turbulence, and to help impose these paths on all ships in the presumed interests of the "Big Few" and of shipping in general.

The troubles which led to the adoption of the Hollywood Production Code in 1930, and to its more definite enforcement since 1934, were predominantly of a moral character. The rising storm of outside censorship and criticism over alleged 'blue material", threats of religious boycott and of federal action convinced the major movie producers, banded together in a trade association, that it was time to act.

The Production Code drew upon a prior list of "Don'ts and Be Carefuls" which had attempted to codify the most damaging bans and deletions of government censors. It was supplemented by reasoning and explanations which bore the imprint of collaboration between Martin Quigley, prominent trade publisher and Catholic layman, and the Reverend Daniel A. Lord, "a trained moralist with an interest in the theatre". (5)

The resulting document, which, with minor changes, still guides the production and distribution of virtually all movies in the United States was of a moralistic character. Forty percent of the lines of the Code pertain to matters of sex. The balance deals with crime, brutality, suicide, murder, drug addiction, religion, executions, liquor, surgery, childbirth, cruelty to animals, and respect of flags, institutions, and people of all nations and races.

The Production Code made no direct reference to mental illness. Indirectly, however, it reflected the fact that its fear of censorship on account of sexual allusions overshadowed other sensibilities. The wording of the Code in effect until 1956 contained the following proscription under the heading of "Profanity":

> No approval . . . shall be given to the use of words and phrases in motion pictures including . . . Nuts (except when meaning crazy). (Our underlining.)

In the 1956 revision the parenthetical note, along with many other "sex examples", was dropped. The tendency implicit in it, however, remained. But that is a matter of administration.

The Production Code Administration

The actual meaning of a Code rests in its day-to-day enforcement. This is the responsibility of the Production Code Administration, a department of the Motion Picture Association of America, Inc. With a senior staff of about ten, a budget of a quarter of a million dollars, and headquarters in Hollywood, the Production Code Administration screens between 300 and 400 films a year, and processes about twice as many scripts. Working under a similar Code, the Advertising Code Administration services more than 150,000 pieces of advertising and publicity material, and the Title Registration Bureau about 4,500 titles a year.

PCA "business" is not limited to MPAA members; about 25 per cent of its work involves U. S. nonmember companies, and 12 per cent of foreign companies. Industry-wide agreements, and other pressures, make the PCA Seal of Approval a virtual, even if not legal, condition for profitable motion picture exhibition in major U. S. theater circuits.

The actual functions of the Production Code Administration transcend the application of the Code. Its "radar" involves constant contact with civic, religious and professional organizations, pressure groups, censorship developments at home and abroad, individual critics, and, of course, members of the industry. Unlike its counterparts in broadcasting, the PCA is rarely concerned with technical or scientific details of screen presentation. PCA files, however, give evidence of consultations with influential groups or persons, especially when potentially helpful in avoiding public pressure or criticism.

We found no evidence of such consultation with professional or lay organizations active primarily in the mental health field. Even those groups and individuals who made frequent and systematic representations to television broadcasters, and who consulted regularly with network censors, were unknown at the PCA office. Movie censorship patterns and policies affecting the portrayal of mental illness evolved largely without the benefit of scientific or professional advice.

We were able to trace the general outlines of policy development through conversations with PCA staff, a study of studio censorship files, and perusal of some annotations to the Code compiled by a former attorney attempting to codify PCA decisions from 1934 to 1947.

The major influences that shaped (often tangentially) Code Administration policies toward mental illness appeared to be (a) its own appraisal of the general acceptability and market value of such themes; (b) its primary concern with the morality provisions of the code; (c) its policy regarding treatment of professions and professionals on the screen; and (d) the fate of mental illness themes at the hands of government censors around the world.

General acceptability

Under the heading of "Insanity", the annotations to the Code declare: "Insanity is a dangerous and unpleasant subject for screen presentation, and warnings against the showing of insane persons are given by the PCA to producers."

Following this statement, the annotations list 40 "leading cases" of script submissions, PCA action, and occasional indications of outside censorship.

The first mental hospital story submitted for PCA approval in 1934 was rejected. However, the producer finally obtained PCA approval and the film became a critical success.

Another case of rejection concerned a horror subject laid in an insane asylum replete with maniacs and monstrosities. Despite the producer's claim of historical authenticity, the PCA felt that this was a "repellent subject". However, the movie was given a "crusading for reform" twist, and was finally released. In a third case a "demented woman" in a comedy script was eliminated by the PCA.

The 40 "leading cases" list 26 instances in which the PCA cautioned producers against the portrayal of mentally ill characters -- 13 of whom were men, 7 women, and 6 unspecified. Sixteen warnings were issued about the depiction of mental hospitals. The remainder concerned miscellaneous "insanity angles".

The annotations include statements such as:

> PCA warned producer about heroine being a girl who is suffering from some form of insanity.
>
> Producer cautioned as to possible consequences in England due to showing King Henry VI as idiot.
>
> PCA warned that leading character in this script not be shown as insane.

Case studies show that these warnings reduced the screen portrayal of mental illness, both in frequency and in the level of histrionics. Still, much of the output left by the PCA was, as we shall see, cut by government censors, and further chopped by network censorship upon release through television.

Effect of morality provisions

Primary concern with the administration of the morality provisions had an oblique effect on the portrayal of mental illness. "The presentation of evil is often necessary for art or fiction or drama," states the Code. This in itself is not bad, it continues, provided wrong is clearly shown as wrong, punished, and balanced by the right and virtuous.

One way to show wrong as wrong and evil as repellent is by showing it to be insane. The Code did not create this ancient literary device, but it does tend to make the medieval notion of mental illness as "punishment for sins" a way out of the moral dilemma. Hortense Powdermaker noted in her study of Hollywood:

> The emphasis on punishment for sin practically amounts to a fetish. A film about a woman who loses her mind because of a philandering boy friend, and murders him, is acceptable, because the woman becomes insane. In this picture the MPAA indicated deletions on the following points: the slapping of a woman, references to venereal disease and an illicit sex affair, and an undue exposure of a woman's leg. These, from the Code point of view, were more immoral and dangerous to an audience than murder, provided the murderer was punished by becoming insane. (6)

Another instance involves suicide. Suicide is sinful, according to the Code, especially to solve problems or to evade justice. But, our evidence indicates, when associated with mental illness, suicide becomes more acceptable in terms of the practical administrative decisions of the Code Administration.

Preoccupation with the Code's standards of conventional morality enhances the probability of morbid, unsavory, and criminal associations attaching to the mentally ill on the screen.

This affinity for acts of crime, or shocking violence, exposes mental illness films to censhorship on account of "excess" brutality or gory details. PCA censors attempt to tone that down by warnings such as these:

> We assume restraint will be exercised in showing G-- as a maniac.
>
> The brutalizing of [Mental patient] goes too far and we ask that at least one of these slaps be eliminated.

There are producers who expect to gain a few slaps in exchange for yielding on the conventional morality angles. The market value of shock in such a context is rated high in some trade circles. When the shock ingredient is missing, the film's chances are thought to be injured.

In connection with G-- of the first example above, Variety remarked that he acted "not so maniacally as the story should have suggested". And in the case of another film set in a mental hopsital, it commented that "the insertion of even one scene of shock or high violence that could be word-of-mouthed would have helped the film's general chances".

Treatment of professions

The annotations to the Code specify that "all of the professions should be presented fairly in motion pictures". They go on to spell out some implications of this statement, and to apply the principle of "compensating values" to the portrayal of professionals:

> There should be no dialogue or scenes indicating that all, or a majority of the members of any professional group, are unethical, immoral, given to criminal activities, and the like.
>
> Where a given member of any profession is to be a heavy or unsympathetic character, this should be offset by showing upright members of the same profession condemning the unethical acts or conduct of the heavy or unsympathetic character.

Surprisingly enough, the fair treatment provision has a questionable practical effect on the portrayal of the mentally ill and of related professionals.

The attempt to single out professionals for special treatment leads to a tendency to avoid showing mentally ill people as professionals. In our study of all identifiable mentally ill male characters playing significant roles in movies released since 1950, only 56 per cent were shown as having had any occupation at all. One-third of these were professional criminals, one-third had miscellaneous occupations, and one-third were professionals. Half of the professionals were "mad" scientists -- and psychiatrists.

When evil, inept, or unbalanced professionals are needed for a story, the line of least resistance is the easiest way out. In our comparison of the portrayal of mental and physical experts, doctors, and therapists in post-1950 movies, we found the "physicals" twice as likely to be portrayed in favorable roles, and six times as likely to play romantic parts, as the "mentals". On the other hand, the "mentals" were three times as likely to be mentally ill themselves as the "physicals".

When "doctors" featured in film titles or ads are cast in evil roles, they often turn out to be psychiatrists, or mad, or both. "The Mad Doctor" (Paramount, 1941) is the story of a Viennese psychiatrist whose hobby in America is to marry and murder wealthy women. He was permitted to commit suicide in the end of the film. The "Amazing Dr. Clitterhouse" (Warners, 1938) is another psychiatrist who becomes a crook to study the "criminal mind". He wound up both criminal and insane. Dr. Callistratus of "Blood of the Vampire" (Universal-International, 1958) conducted his fiendish experiments (aided by brutal guards, a misshapen mute, and a pack of murderous dogs) in a "hospital for the criminally insane".

Government censorship

Films containing themes, settings, or characters associated with mental illness run into a great deal of government censorship. This fact prompted the PCA to note that insanity was a "dangerous" as well as unpleasant subject.

In most cases of warning about mental illness the PCA specifies outside censorship as the cause for caution. The annotations record that at one time "England has served notice that she will cut all insane persons or scenes in mental hospitals".

Case studies indicate that pre-World War II government censorship of mental illness films was heaviest (although by no means limited to) the British Commonwealth and Scandinavian countries. Since the war, official movie censorship in the United States has been confined to its last legal stronghold -- sex: and the British are reported to have relaxed their ban on mental illness.

Our check of recent films found that 20 per cent of all movies portraying mental illness -- in forms as diverse as "I Was A Teenage Werewolf" and "Three Faces of Eve" -- still ran into censor trouble between 1950 and 1958. Most of these were cut, restricted, or banned in England and Australia; a few in such places as Eire, Hong Kong, Singapore, Brazil, India, and Indonesia.

Obviously, the reasons for "censor trouble" in these films are no longer confined to the portrayal of mental illness per se. What is suggested is that the context which surrounds the portrayal, rather than the theme itself, evokes the ire of most government censors. On the whole, it cannot be said that government regulation today is a major factor inhibiting a serious and responsible approach to mental illness and related subjects in the movies. Neither can it be said that the Production Code or its administration prevents the production of such films, or has blunted the edge of those that have been produced in recent years.

What we might conclude is this:

Industry-wide motion picture trade censorship reflects a lack of contact with professional and scientific opinion in the mental health field. The paucity of consultation on an industry-wide level means that while some major producers avail themselves of the best professional advice, there is no suggestion to the lesser producers, and to the numerous small-budget productions, to do so.

This pattern of censorship, or lack of censorship, manifests itself more in the run-of-the-mill movies output than in the outstanding exceptions. The changing trends in acceptability and censorship of mental illness themes has led to a relaxation of general PCA opposition to the subject. But under the pressure of presumed requirements of markets for certain types of pictures, the specific applications of the Code tended to work at cross-purposes with the PCA's own standards of desirable portrayal.

Broadcasting Industry Censorship

The broadcasting codes, once modeled after the motion picture Production Code, have come to reflect the broad scope of radio and television in the life of the community. Sex and conventional morality is not their main preoccupation. They also contain sections on children's programs, "community responsibility", public issues, political affairs, and the "advancement of education and culture".

All-industry codes were first adapted for radio in 1937 and for television in 1952. They were a composite of existing networks' codes. Both the all-industry codes of the National Association of Broadcasters and the network codes make specific reference to mental illness. The NAB Standards of Good Practice for Radio Broadcasters states:

> When plot development requires the use of material which depends upon physical or mental handicaps, care should be taken to spare the sensibilities of sufferers from similar defects.

The NAB Television Code uses similar language:

> In reference to physical or mental afflictions and deformities, special precautions must be taken to avoid ridiculing sufferers from similar ailments and offending them or their families.

The Television Code also states that "Excessive or unfair exploitations of others or of their physical or mental afflictions shall not be presented as praiseworthy".

In regard to the professions, the Code declares that "Legal, medical, and other professional advice, diagnosis and treatment will be permitted only in conformity with law and recognized ethical and professional standards".

The network codes contain similar provision. They also make such flat statements as:

> Insanity and feeblemindedness are not acceptable subjects for comedy routine.

> The presentation in plot development of physical or mental maladjustment is permitted only when it is within the bounds of good taste.

Of course the bounds of "good taste" and acceptability are, as always, what the censors say they are. Since the enforcement provisions of the national code are relatively toothless, and since the NAB exercises no pre-broadcast censorship, the censors who really count are those in the networks.

Network Censorship

Network censorship began in the mid-thirties. The departments were originally commissioned to make "common sense" decisions regarding the acceptability of proposed broadcast content ("continuity"). Today all networks have departments of "Continuity Acceptance" or "Editing" to perform the functions of internal censorship, and each network has its own codebook of standard practices.

Although administrative arrangements differ, functions and policies of censorship are similar among the networks. In fact, in some places censorship staff members of different networks hold informal but regular joint meetings to iron out common problems that arise, and similar exchanges via the telephone are not uncommon. For these reasons, network censorship may be considered both fairly uniform, and industry-wide.

The task of the network censors, however, transcends the administration of codes. The codes are distant, general guideposts, not especially applicable to the highly specific activities of these arbiters of "good taste". In fact, one Continuity Acceptance executive mentioned that he wouldn't change his activities at all, if there were no NAB Code. The day-to-day activities of network censors are more a matter of practical navigation amid the cross-currents of the sea of public relations.

We found mental illness an area of special concern to network censors. One staff memorandum found in a network file expressed the feelings of one censor in somewhat florid but not overly exaggerated terms:

> By comparison I think we, collectively, spend more time in the interests of MENTAL HEALTH than any other group or organization of its kind. This may be the result of any one of a number or combination of: (a) many officers of the Mental Health Association are those employed in the entertainment profession; (b) the media itself and our ability to come into intimate contact with all members of a family and all classes of society;

> (c) our conscious moral responsibility to the viewing public; (d) our lawful responsibility to the various federal agencies (and consequently to local agencies and their offspring); (e) our own personal reaction to the great human tragedy . . .
>
> Specifically we are more concerned with line and dialogue deletions as opposed to characterization because of the shorter length of the programs to which we are currently assigned. There is not too much of the necessities of story plot, action, and the fundamentals of story construction . . . In particular our deletions and word substitutions are categorical: "crazy", "lunatic", "loco", "looney", "crackpot", "idiot", "nuts", "screwy", "bats", "bughouse", "goofy", "cracked", etc. their many slang derivations and synonyms.

Another staff memorandum addressed to the head of the censorship department of another network accounted for a different type of activity. In this case, a story editor, after consultation with a member of the Mental Health Foundation, not only made deletions in the script of a program, but added dialogue showing how "Mental Health authorities have been working with police departments to educate them in treating mental patients as sick people -- not criminals".

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We searched network files for documentary material that might yield a systematic picture of over-all censorship operations. Space allows for the brief description of three types of material studied. The first is a selective subject-matter file kept by one network for training and reference purposes. The second is a record of all film deletions and rejections by another network censor. The third covers the monthly reports of a network censor's office for a period of three years.

The "Mental Afflictions" training file: development of censorship

Some network censors use a set of subject-matter folders for training in addition to the general reference files. These files provide a guide to major policy problems, decisions, and to the "state of a field" as presented to the public in the mass media. One network practice is to require new staff members to study the training file before starting a period of apprenticeship.

These training files do not generally reflect the range of censorship activity pertinent to the subject. They contain a veritable potpourri of materials --

some reflecting what the director and senior staff thought important to circulate, or clip and file, and others merely reflecting what happened to be available at some time or other. Their content of letters, memoranda, clippings, articles, etc., is somewhat indicative of evolving standards of acceptability, and of some aspects of policy development.

The content of the "Mental Afflictions" file at one network dates to 1948. However, 1955 and 1956 yielded more material than all other years combined. The flow seemed to taper off after 1956.

We were told that the main purpose of the file was to acquaint new staff with the "touchy problems involved in the portrayal of mental illness". In fact, the file itself stemmed largely from the memos written by a staff member who took exception to some scripts for somewhat personal reasons.

A 1948 commercial skit proposed to feature two comic characters: Dr. Ludwig von McNutts, a psychiatrist, and Cranium Crackadome, his patient. A staff note objected that this was in poor taste. The writer of the commercial protested; everybody does it, he wrote, famous comedians thrive on this kind of humor, why pick on me? All very regrettable, came the reply; this kind of humor is improper and should be stopped. This was the first entry into the training file on "Mental Afflictions".

The same staff member objected, three years later, to a mystery program in which schizophrenia was a part of the plot. "Instead of trivial treatment, " he commented, "I hope fervently that writers mature enough to forego the use of mental illness as a dramatic device will emerge on the broadcasting scene. "

Conversations with the department head indicated that the views and feelings of this staff member were instrumental in establishing some early landmarks of network policy toward the portrayal of mental illness. It also developed that the staff member's brother was in the Veterans' Administration mental hospital.

The file began to grow. Incidental items -- mention of breast feeding in an educational film on emotional disturbance (approved), use of the word "homosexual" in a lecture on poetry (deleted) -- found their way into it. Newspaper stories and letters referring to the portrayal of mental illness on the air began to be noted.

Two specific script decisions date back to 1952. In a drama program about an "escaped homicidal maniac" the phrase "laughing crazily" was changed to "having a menacing expression", and "raging madman" to "escaped inmate". The script also called for a mental hospital attached to the state prison as the scene of escape; this was changed to eliminate the association with the prison.

The other case involved the story of a murderer faking insanity. The court psychiatrist pronounces him sane; the fakery comes to light in other ways.

This script was rejected and put in the file for the guidance of the staff as an example of objectionable material placing "an entire profession in bad light".

In the following years, the file paralleled the rising trend of popular literature on mental illness. Included in the training file are five articles from the Reader's Digest, a six-part series from The Saturday Evening Post, stories from Sunday supplements, Today's Health, Variety, and other publications. Among the authors were Leonard Engel, Stuart Chase, and John Bartlow Martin. Subject matter ranged from the emotional causes of stuttering, through tranquilizers, to such topics as "My Daughter is Allergic to Me", "Facts About Mental Illness", "Heredity and Mental Illness", the present state of psychiatry, how to deal with frustration, the "open door" mental hospital, and "TV's Quieting Effect on Mental Patients".

A number of memoranda, dated mostly in 1955 and 1956, reflect the activity of organizations and other networks in the mental health field. One memo to the staff reported on a major program featuring mental illness on another network. Another commented on a Veterans' Administration sponsored program: "Although the entire script was stark and grim", it was noted, it was acceptable because "it ends on a note of hope".

By 1956, special interest groups began to assert their influence. The American Psychiatric Association, state mental health groups, and the NARTB Television Code Review Board all wrote letters, protests, and "offers to help" to all networks on the subject of mental illness terms and jokes used on the air. The replies, duly noted in the training file, indicate a hardening of verbal rules especially in comedy. "Crazy", idiotic", "imbecile", "nuts", "having loose marbles", and "off his rocker" were especially singled out for condemnation.

"We do our utmost", asserted one reply, signed by the president of the network. "We try to cut it down, but occasionally it does creep in", acknowledged another in response to a complaint about more of the words. Both complaints and replies placed the blame on comedies and comedians' ad libs for many of the offending remarks. The staff was urged to increase its vigilance and pay greater heed to the sentiments expressed in these letters, replies, and memos.

The flurry of high-level activity apparently came to a peak with the circulation and filing of the 1956 annual report of the National Association for Mental Health, accompanied by a staff memo calling attention to certain pertinent positions. After that, the file gained only a few routine and incidental items.

Some strands of policy development reflected in the training file, and confirmed in our interviews, appeared to be (a) postwar awareness of the problem of mental illness preparing the ground for later receptivity and close scrutiny; (b) personal involvement and influence inside the organization leading to significant policy decisions; and (c) expressions of interest and concern from influential outside groups resulting in the search for some tangible censorship yardstick -- such as a list of words and phrases to be deleted.

Let us turn next to an examination of the actual pattern of the "gatekeeping" activities at another network.

The TV film clearance file: pattern of censorship

Censors keep a record of cuts, changes, and rejections of all film material for broadcast over network facilities or by affiliated stations. This record is the TV film clearance file. It contains cards on feature films (originally produced for theatrical release) and filmed TV programs.

The cards in this file contain information about the type of film or program, date and place of screening, story or subject matter, censorship action (if any), and reason for deletion or rejection, unless evident. This file records the censor's last shot at a finished program, and indicates the addition of the TV censor's "living room" concern on top of the original "box office" concern of the movie censor.

The file we studied dates back to 1948 and contains many thousands of cards. It is divided into two general categories: old-time comedies, shorts, and cartoons; and full-length features, filmed TV shows, and documentaries. We shall deal with the latter category.

Our search of the feature and TV film file yielded no reference to mental illness in theme, plot, or deletion prior to 1951 (years of relatively little screening). From 1951 to 1954 we found a total of only five films containing mental illness reference. The boom obviously started after 1954.

Table 1 shows the number of relevant films screened and cut by the censors. A film was considered "relevant" if the card in the clearance file indicated that it contained a mental illness theme, reference, or character, or if the censor's comment had any relation to mental illness terms.

Table 1

Relevant Films Screened and Cut by the Censors

Year	Screened	Cut
1951-53	5	--
1954	27	6
1955	39	16
1956	124	81
1957	170	112
1958	73	38
Total	438	253

We can see that on the whole censors made deletions in more than one out of two films containing some reference to mental illness themes or terms. The rapid increase in relevant films cleared and proportion of films cut by censors from 1954 to 1957 can be attributed: (a) to increasing sensitivity of network censorship to mental illness themes and terms, and (b) to a high incidence of such material both in the pre-1948 movies purchased and screened during that period and in the various "adult" trends in television programing.

The apparent decrease in 1958 is due to the lower number of feature movies acquired and screened that year and, according to the censors themselves, to the effects of tightened censorship on TV material; writers of scripts began to pre-censor their own material, giving the censors fewer occasions for making cuts in the finished programs. However, censors still made deletions in one out of two relevant filmed network telecasts in 1958.

The number of outright rejections averaged three per cent of all relevant films screened during the period, and fell down sharply by 1958.

Examination of the thematic elements and kinds of deletions made indicates a sharp rise in verbal cuts, and corresponding relative decline of mental illness themes as reasons for selecting relevant cards. However, the absolute number of thematic elements related to mental illness and noted on the cards more than doubled between 1954 and 1957.

Table 2 shows the percentage of cuts by major film types. Films are also divided into features, originally produced for theatrical release, and filmed television programs.

Table 2

Deletions by Kind of Film

	TV film	Feature
Drama	47%	67%
Mystery	60%	69%
Western	65%	88%
Comedy	74%	100%

We can see from Table 2 that comedies were most likely to suffer deletions on account of mental illness reference. They were followed by westerns, mystery, and general drama. (The last line, for example, should read: of all relevant filmed TV comedies, 74 per cent were cut by the censor. The rest, while apparently containing mental illness themes or reference, were not cut. However, all relevant feature film comedies were cut by the TV censor.) It is also apparent from Table 2 that feature films (mostly pre-1948 vintage) led in every category of deletions.

A special check of the 27 documentary films indicated only two deletions and two rejections, possibly reflecting some careful pre-release editing by the producers, and/or a more informed approach to the subject stemming from consultation with mental health organizations.

Mental illness themes or characters appeared more frequently in TV than in theatrical feature films. In addition, while such themes in TV films occurred most often in general "drama" programs, mental illness themes in theatrical feature films occurred more frequently in horror and mystery films than in other types. This contrast points up a tendency to associate mental illness with the more bizarre aspects of human behavior in feature films, while TV appears to emphasize mental illness for "dramatic" purposes.

There was little relationship between the occurrence of a verbal deletion and a mental illness theme in the same film. In feature movies, only one in thirty verbal cuts involved a film actually dealing in any way with mental illness. In the TV films the corresponding proportion was one in seven.

Since feature films were the major offenders of verbal mental illness taboos, they offered a greater variety of censored words. In general, the most frequently deleted words were "crazy", "idiot", and "moron". These were followed by "nuts", "screwy", "imbecile", "insane", "psychiatry", "feeble-minded", "lunatic", "looney", and "half-wit". The last eight words occurred (or were cut) in feature films only.

Phrase deletions were often made necessary by the occurrence of a single objectionable word as in "crazy about me", "crazy ideas", "like a drooling idiot", etc. At times they combined several objectionable elements as in "You think Orientals are crazy?" Still others contained such terms as "schizophrenic", "neurotic", "psychiatrist", "insane asylum", "nervous breakdown". Their use was considered flippant or otherwise inappropriate in the context of the film.

If we remember that these films and programs usually arrived to the final screening stage after going through prior censorship at different levels, and note that the word "crazy", for example, was still found misused 123 times in 338 films, we may well wonder how far censorship must go to adjust media output to current sensibilities. But that is no longer a matter of the clearance record; that question pertains to the matter of censorship theory and practice.

Interoffice correspondence file: theory and practice of censorship

One network censor writes and circulates a monthly mimeographed report of activities and reflections. These reports are a part of the network's interdepartmental correspondence. They are circulated, wrote the censor, in order to "attempt to keep our appraisals along common-sense lines before those of our colleagues are in any way affected by them".

The reports contain examples of deletions and changes called for by the department, of pressures, comments and criticism received from various sources, of problems that arise from time to time, and of the reasoning behind certain decisions. Implicit (and often explicit) in these reports is a philosophy and pattern of regulatory practice characteristic of network censorship.

Our research included a content analysis of a three-year (1955-57) file of these reports. Although the editor published only four letters of complaint relating to mental health, the subject itself drew heavy comment as a result of the inclusion of statements from special interest mental health organizations, plus the editor's personal comments.

It is not the number of letters from audience members that is important, but rather the extremely sensitive way in which they are reported in the department bulletin. The following example of criticism stemmed from a single line of dialogue included in a comedy program, yet the importance of this criticism was underlined by the editor's comment. The criticism concerned the use of the exclamation "What a schizophrenic, confused child!" which was explained in the script as being equivalent to the expression "Crazy, mixed-up kid". The letter writing critic was a "simple postal clerk" whose eldest son is "currently hospitalized, undergoing insulin treatment and seriously sick with some form of schizophrenia". He contended that a medical term for so serious an illness was not suitable for comedy use any more than one would humorously use medical terms like coronary thrombosis, malignant cancer, etc. Commented the censor: "There is a logic to that argument." He also saw fit to add:

> The complaint is not dissimilar from one we received from a mother whose child died of water on the brain and who saw nothing funny in its use on [another comedian's] radio show. The bitter family frustrations of some members of our audience make them very sensitive to any sort of humor based on these illnesses.

This type of complaint indicates the broadcast censor's main focus in the deletion and change of specific words and phrases. The word "crazy" is a good case on point. The "proper" use of the word was discussed frequently and at length in the reports analyzed. The following excerpt aptly summarizes this controversy:

> Could I try to clarify for those who seem to be misunderstanding it, our policy on uses of the word "crazy" and synonyms thereof? Of course many of us in spontaneous speech use the word and it naturally enough crops up in radio and television scripts. Our feeling is not that it is totally taboo, but that where it is so persistently and often equated with mental and emotional illness, it approaches being mercilessly tactless. We are trying to discourage this. We do not take the position that we refuse to take the word "crazy", but urge substitutions for it wherever feasible. Very few plots are in any way damaged if a line "you're crazy" or "you're insane" is changed to "you're a fool". Semantically speaking it is the latter that is meant anyhow and it injures no one who is mentally disturbed. Let's not have our network in a position of bearing a stigma that we don't know anything about the prevalent problem of mental illness in our country.

Not to be overlooked in the foregoing is the indication of one of the prime motivating factors underlying censorial activity: Being branded with the "stigma" suggested in the final sentence would be at variance with the censor's responsibility to maintain network good will and public relations.

These reports indicated, and our interviews confirmed, that some gatekeepers are not entirely satisfied with merely deleting this word or changing that one. On behalf of what they consider to be worthy causes, they will attempt to exert a more positive influence. The circulation of these reports of their activities is in itself presumed to have a formative influence on production personnel and, hopefully, on writers as well. Occasionally, censors will also issue a call for certain types of material. For example, the monthly report requested radio and TV writers to submit scripts dealing with mental health "as near Mental Health Week as possible, or any time for the whole year ahead". It also plugged for the "so-called canned pitches prepared by the National Association for Mental Health for slotting-in anywhere time allows". Some censorial "radars" appeared so sensitively tuned to certain topics that occasionally the department itself appeared in the role of a "special interest group", boring from within the network.

In our conversations with this gatekeeper, he indicated a belief that network policies in regard to mental health are well motivated. But he felt that perhaps this "do good" approach, as he calls it, is primarily a matter of self-protection of the networks interests and relations with the public, the experts, etc.

In addition to network concern for acceptable mental health presentation, there appears to be a considerable amount of individual concern. It was not uncommon to hear of a personal or family experience ingredient which instilled in the individual a heightened awareness to the proper presentation of mental health. One advertising executive active in both broadcasting and motion pictures suggested less-than-half jokingly that the best way to improve the portrayal of mental illness in the mass media would be to provide psychotherapy for all mass communicators -- "so that they can understand human motivation".

The combination of pressures appeared often to lead to a search for formulas, and to qualms about hypersensitivity. Censors turned to the professions for "rules of thumb" they could apply with both firmness and unimpeachable logic. They were restive about the qualified and at times conflicting views of experts. As often insecure arbiters of standards in what appeared to some as cultural anarchy, they felt that at times they have allowed themselves to "lean over backwards" too far in one direction, or to become too "precious" in their concern over words such as "crazy".

In their more plaintive moods, censors felt like pawns in the hands of outside forces, and wished to exercise their censorial function as little as possible.

> Our basic approach as standards-keepers seems to boil down to 'He censors best who censors least'. Much of professional television censorship is very positive, as logical and defensible as telling a man he can't shout 'Fire!' in a crowded theatre. When it is an informed censorship it is 'editorial responsibility'; when it isn't it is misguided and foolish. The confusion seems to sneak in in relationship to pinning down just who is doing the censorship, my experience making me insist that much of it is from without -- from the viewing side of the television screen, from viewers or groups of viewers, from spokesmen for this or that political or philosophic position, and from the promoters of goods and services who, viewing television, select it as a medium to advertise and sell their wares.

At other times censors become concerned over their possible role in the alleged trend toward blankness of broadcast fare. Is life as aseptic as our critics want it to seem?", they asked. Should standards accommodate only sensibilities and tastes, or also possibly unpleasant or even offensive truths?

> I think it's obvious . . . that we do try to maintain a fair regard toward anybody's special interest. But by the same token if every special interest were to constitute a new entry in a list of taboos, we'd have to go out of business. It seems therefore . . . our function

> continues one of calling the shots, censoring the malicious and consciously not censoring honest reflections of the troubled world in which we live.

This line of reasoning, it is easy to see, places censors into the unenviable position of having to decide who is malicious and who is honest. In practice it is easier and safer to be concerned with what is said, and who is hurt by what is said. All media censors have a stock reply to use in case of almost any kind of criticism of what is allowed to appear in public. The reply is, "But you should have seen what we cut out". And this probably applies to mental health content as much as to any other.

Conclusions

We have reported some studies and observations probing into the effects of motion picture and broadcast censorship upon the communication of ideas and images of mental illness. We did not attempt to elaborate here on the general idea of censorship, assuming simply that this kind of internal "gatekeeping" activity in commercial production is in effect similar to the quality-control functions of any industry. Nor did we deal here with the total process of cultural production and media policy formation -- such as considerations of "good showmanship", potential sponsors, etc. -- in regard to the portrayal of mental illness. These and other factors are all involved in production and content decisions in mental health and illness programing -- as in any other program area -- but have to remain for other reports.

In this report, then, our vantage point was limited to a level of controls in which neither the major creative factors nor the principal market functions governing mass communications could be viewed directly. However, we see our present slice of the control process as one which has rarely been studied, and which both reflects and effects the pressures and policies governing the mass communication of ideas and images.

Censorship reflects broad cultural developments. The postwar "cycle" of psychological films, and the similar trend on television in the mid-fifties, reflect changing patterns of censorship and of changing cultural standards as well. Some motion picture taboos were relaxed, and some new sensitivities in television emerged. One result was an increase in outstanding dramatic productions in the mental health area; another was an increase of censorial activity with mental health references in peripheral programing (e.g. the "crazy" controversy).

While some standards of acceptability changed, and while both humane and scientific awareness lead to closer scrutiny of material, the march of screen horrors, ghosties, ghoulies, and "mad scientists" also continued, and today show signs of renewed vigor. Censorship files testify to the mounting concern over the side-effects of the dramatic association of horror, crime, and violence with the portrayal of mental illness.

Hollywood's morality code might have increased the probability of this association. Because of the nature and history of theatrical movie production, there appeared to be little contact between mental health organizations and the Production Code Administration. The treatment of mental health professionals on the screen suffered. Market pressures in an era of declining theatrical movie production appeared to make the application of changing conceptions of mental illness to the run-of-the-mill Hollywood product more difficult.

Faced with a desire if not a need to stem this rising tide, broadcasting networks reacted by placing a censorial finger in some of the leaks in the dike. This reaction developed under the pressures of close contact with viewers, professional and civic organizations, and out of personal involvement and conviction. In many ways, "Mental Health" was a safe, respectable, and worthy crusade for public service-minded and public relations-conscious broadcasters to undertake.

Comedy was singled out for mental health censorship. But all programing areas were affected. By far the greatest volume of activity occurred in the form of verbal changes and deletions. The demands and volume of broadcast industry operation vitiated a more wholesale censorship of programing. There were some attempts by the gatekeepers to stimulate more high-level production in the mental health area. Experts in the field were frequently consulted.

This report obviously is not the last word regarding mass media regulation of the portrayal of mental health and illness. It is not even the last word on the formal censorship of such content. The standards and "rules-of-thumb" of this formal regulatory activity deserve more investigation -- not only in regard to their origin and application, but also to the consequences of their application. And this raises a crucial point: Does it really make a difference in public attitudes and opinions whether the word "crazy" is used or whether mental institutions are shown with or without barred windows? Studies of the effects of certain message variables on the presentation of mental health information are going on on other fronts (for example, other phases of the same project that spawned the present investigation). Similar empirical studies of the possible effects of the various content decisions made within the commercial context of the mass media are also required. Not least, the areas of possible conflict between the validity of dramatic or documentary presentation and the felt expediency to protect existing markets, tastes, and public "good will" deserve further scrutiny.

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A SCIENTIFIC CONVENTION AS SOURCE OF POPULAR INFORMATION

GLYNN L. WOOD

Scholarly conventions, like those of the American Psychological Association, result in widespread dissemination of ideas through the profession. But what ideas go from such conventions directly to the public? Mr. Wood, who is now with the United States Information Service in Beirut, made this study in an attempt to understand and assess the flow of information from convention to public.

A SCIENTIFIC CONVENTION AS SOURCE OF POPULAR INFORMATION

by

Glynn L. Wood

The Convention

From September 1 to 7, 1955, the American Psychological Association held its annual convention in San Francisco. During that week 208 meetings of a technical nature were held, at which 420 research reports, 23 speeches and 64 symposiums were given.

Theoretically then, over 500 news stories could have been written about the convention, without counting the miscellaneous advances and interviews common to all conventions.

Obviously the problem for the reporters covering the convention was one of selection -- of choosing from this mass of material the items which, in their opinion, had the most of that intangible -- "reader interest". In making their selections, the reporters were acting as gatekeepers in the communication chain between the psychologist and the newspaper public. Any difficulty at this point could be a block to the dissemination of psychological knowledge to the general public, and may be relevant to the larger problem of the utilization of the social sciences. It is the purpose of this paper to look into this selection process, to see how the reporters made their choices, the limits within which they worked, and how well, from a psychologist's point of view, they handled the material.

The first step in this study was simply measurement of the stories carried in the San Francisco papers and in a small sample of papers outside San Francisco. This was followed by interviews with the reporters who covered the convention and with the chairman of the convention's public relations committee, Dr. Thomas Harrell. Finally, copies of the newspaper stories were sent to the psychologists whose findings were reported. The psychologists were asked to comment on the accuracy of the articles.

The Reporters -- Their Methods and Attitudes

Five San Francisco reporters covered the APA convention every day, representing three of the four city papers, the local office of the New York Times, and the local bureau of the Associated Press. The fourth San Francisco paper assigned reporters on a day-to-day basis. While only the AP man was a full-time science writer, the other three regulars were members of the science writers' organization and handle most of the science news for their papers. The correspondent for the Times did not specialize.

The most noticeable fact about the coverage of the convention was the amount of agreement, particularly between local reporters, on which items were newsworthy. While the four local papers carried an average of 23 items each, only 45 of the 500 possibilities were covered at all. Only 14 items were used exclusively by one paper and these were almost all used, incidentally, not as lead stories.

Table 1

Frequency of Use

Items used by one paper	14
Items used by two papers	18
Items used by three papers	9
Items used by four papers	4
	45

In the traditionally competitive profession of newspaper reporting this amount of agreement would seem unusual.

The near-consensus of opinion can doubtless be explained in part by agreement on news values. In larger part, however, it can be traced back to the work of the APA and to need for cooperation in handling a convention of this size. As papers were able to assign only one man to cover the convention regularly, efficient coverage could be had only by working through the pressroom, headed by professional press relations man Michael Amrine.

The procedure set up by the APA was simple, and is almost standard operating procedure for well-run conventions, according to the reporters who were veterans of other conventions.

Before the convention the reporters were given copies of abstracts of the papers to be given, plus a number of press releases dealing with research findings. After reading the abstracts and the releases, the reporter selected the items which he thought had possible news value and requested either the complete text, an interview with the psychologist who was to make the presentation, or both.

The pressroom then got in touch with the psychologists, and ran off copies of complete texts. For the less important stories, abstracts and press releases were often enough. However, more than 70 per cent of the newspaper articles included material which was in neither the abstracts nor releases.

The reporters felt that they were able to translate the psychologists' findings into lay terms more easily and correctly in the informal interviews than they would be from listening to the "live" report intended for other psychologists.

The interview method also allowed the reporters to gain a time advantage. By scheduling an interview the day before a report was to be given the reporters could work on the story overnight, and have no trouble in making the early edition deadlines.

Thus, with the exception of the speech made by Dr. Oppenheimer, the convention was covered from the pressroom in the Sheraton Palace Hotel by the local reporters. (1) This procedure was systematic and while it did tend to limit the variety of coverage, the limit was set by the reporters.

The APA was able to play a large part in the selection process by the advance preparation of abstracts and news releases and by the close relationship between the reporters and public relations director Amrine. The importance of the working relationship between reporters and the pressroom was brought out by several of the reporters interviewed. One said that because of the volume of material, the reporters relied heavily on Amrine's judgment. He said that at conventions where the reporters do not have confidence in the pressroom, it is possible for them to spend as much time checking what they have been told as in writing.

While all six of the reporters interviewed felt that press relations were well handled by the APA, there were instances of friction, inevitable between two groups whose purposes are not the same.

The pertinent question is, which of these points of friction are attributable to personal relationships at this convention, and which are more general and work elsewhere also against the utilization of the findings of psychology?

In reading through the articles written on the convention one may easily find examples of the old unfavorable stereotypes, and a slightly negative attitude toward psychology as a science.

Examples of this attitude are:

> Under the awesome title of 'Some Psychological Correlates of Differential Fertility' a paper on the subject was delivered today. . . (2)

> A trio of Harvard researchers . . . played a mean trick on a bunch of school kids to reach this conclusion. (3)
>
> [The scientist] concluded it was better for the angry individual to blow off steam. He didn't mention, however, what's better for the people around. (4)
>
> As anyone might guess, Communists are more opinionated and dogmatic than those of other political hues. (5)
>
> The obvious theory: migraine headaches are the result of . . . (6)
>
> The 'ego strength' -- which is psychiatric jargon for 'horse sense' -- of a mentally ill patient has proved a useful indication of how well he will respond to psychiatric treatment. (7)
>
> Dr. Oppenheimer ostensibly set out to draw an analogy between his own objective science of physics and what even its own practitioners admit is the highly subjective pseudo-science of psychology. (8)
>
> Do people who are strongly committed to a rigid, authoritarian system tend to be more dogmatic and opinionated than people not so committed?
>
> The answer would appear to be obvious, but psychologists are not happy until they can demonstrate the obvious by measuring it . . . (9)

It must be said, however, that from the interviews it was apparent that these writers take their jobs seriously. They see themselves as interpreters between science and the layman. As for social science, several commented that they thought it was easier to handle than physical science and that it had more news value.

Yet in the interviews a certain impatience with psychology as a science was expressed. The common cliché seems to be "as much an art as a science". Findings reported by psychologists were criticized as trivial, inconclusive, and not pointing to anything.

The validity of these criticisms is outside the scope of this paper. It is sufficient to say that the attitude exists and creates one block between journalists and psychologists, and that to some extent it colors the coverage of psychological news.

Another complaint often voiced against the psychologist is his tendency to talk in jargon. Dr. Neil D. Warren, the president of the Western Psychological Association, emphasized this point in a speech in which he said that psychologists must learn to talk in understandable terms, particularly if they are to take part in industry's change to automation. Dr. Warren's speech was well received by the press; two local papers and the New York Times ran stories on it.

All but one of the reporters interviewed agreed that jargon did make communication difficult. The dissenting reporter felt that jargon was a necessity for scientists in communicating with their fellows, and that it was the task of the science writer to translate or interpret the jargon into lay terms.

There was also some difference of opinion among the reporters as to how much the jargon, or the ease of translation, affected the coverage of the convention. Several thought that the ease of translation would be a factor when time was short, for the easy story would be chosen in a rush. These reporters did say, however, that the interview system overcame most of the difficulties involving time and technicality, and that a tough story would be translated if it was worth the effort.

The Coverage

While the convention was in progress three reporters handled no other assignments, working overtime on occasion. The AP man spent half of his time on the convention and the New York Times man used almost all his time. During the week the convention received 841 inches of space in the news columns of the four San Francisco papers. This seems to be as much as can be expected without a change in the papers' general policy in assigning reporters.

Even though local coverage appears to have been near the saturation point, all of the reporters agreed that in the rush of a convention of this size, stories which might be newsworthy at another time are passed over.

Here the local nature of newspapers enters in, for a report by a Harvard psychologist may be newsworthy in San Francisco during a convention, but not if given two weeks later in Boston. Still some material seems to be wasted, although the convention increases the amount of news of psychology in the host city.

Judging from the sample of papers dependent on wire stories, however, the convention did not fare as well under wire editors' scissors. (See Table 2) Considering that the Associated Press put two stories a day on the wire, the mortality rate was quite high. Of the thirteen stories run in the ten-paper sample, only one was used by more than one paper. While the sample in this study is too small for a definitive statement, this does seem to be a weak spot in the convention coverage. Perhaps this is inevitable, considering the competition which science stories receive. Any improvement at this point would require changing wire editors' concepts of "news value".

Table 2

Column Inches Carried on Convention

San Francisco	
Call-Bulletin	56.2
Chronicle	246.5
Examiner	304.6
News	234.1
	841.4
National	
New York *Times*	75.8
Time	7.0
	82.8
Wire Service	
Atlanta *Constitution*	0.0
Chicago *Tribune*	1.3
Denver *Post*	4.0
Los Angeles *Times*	15.2
Palo Alto *Times**	5.8
Portland *Oregonian*	21.7
St. Louis *Post-Dispatch*	4.0
San Jose *Mercury*	10.6
Seattle *Post-Intelligencer*	12.9
Washington *Post and Times-Herald*	0.0
	75.5

*Not included was 23.5 inches of locally written material on Stanford University professors who were to participate in the convention.

Table 3

Coverage of Types of Meetings

	Total	Covered	Per Cent
Research reports	420	32	7.62
Symposiums	64	10	15.63
Speeches	23	5	21.74
Other technical	20	0	.00
Film	8	0	.00
Business-social	52	0	.00
	587	47	8.01

Table 4

Frequency and Volume of Coverage

	Covered	Articles	Inches	Average Length
Research reports	32	71	389.0	5.5
Symposiums	10	31	256.8	8.3
Speeches	5	19	204.7	10.3
Miscellaneous items	--	26	172.7	6.5
	47	147	1,023.2*	7.0

*Figure includes the San Francisco papers, the New York *Times*, *Time*, and the wire service sample.

In determining what was covered, it was convenient to classify the parts of the program which dealt with technical material as either research reports, speeches, or symposiums. There were twenty other technical meetings ranging from round tables to topical sessions, but none of these meetings was covered by the press. While there is some overlap between the research reports and speeches, the three classifications are helpful, as there was some difference in the way they were handled, and in their content. The research reports, with few exceptions, were available in abstracted form some time before the convention. Copies of the presidential speeches (by presidents of the various sections of the APA) were available before they were made, but not as early as the abstracts. Usually the symposiums could not be handled in advance. In content there was a basic difference between symposiums and research reports. Symposiums usually covered a broad field, such as alcoholism or juvenile delinquency, and consisted of expert opinion rather than discoveries of new facts. The research reports, on the other hand, were new, but were narrower in scope. The speeches were somewhere between, as some speakers gave reports on research, while others delivered more general commentary.

In measuring, it was found that speeches and symposiums were more likely to be covered than the research reports and were likely to be covered in greater detail. (See Tables 3 and 4) Associated Press coverage was the exception to this. Only one reporter was not aware of this tendency. The reasons given were that the research reports tended to lack interest, as they were only small steps in the accumulation of data; many of the reports were only verifying former experiments; the reports did not seem to point to anything; they tended to be technical and fragmentary, and the complete texts of the major speeches were available, while only some of the research reports were.

There was some disagreement among the reporters as to whether this was true of other scientific conventions. Two reporters said that research reports are usually of prime importance in medical conventions. Two thought that the speeches and symposiums usually get the biggest play in most scientific conventions, but that the really good stories come from research reports.

The Associated Press placed more emphasis on the research reports. The AP man explained that as new material, the reports had more value for the nation-wide audience of the Associated Press. In his opinion symposiums which are held separately often make good news material, but those held as part of a convention are usually rather ragged and poorly prepared.

Presidential addresses for the sections of the APA were only slightly more likely to be covered than other speeches. Yet the "who" factor was not completely absent, for while only 25 per cent of the research reports were given by California psychologists, 47 per cent of the reports covered by the newspapers involved a man from within the state. As the host state, California naturally had more delegates, yet it seems that again the local interest of newspapers caused the California psychologists to be mentioned more often.

Perhaps the most difficult problem in determining why certain items were covered is in defining just what "news interest" is. The public relations committee for the convention suggested in a report (in connection with acquiring radio time) that studies concerning juvenile delinquency, sex, alcoholism, mass media, and political issues are most likely to receive consideration.

It is easy enough to categorize at least 45 of the 47 different items which were covered into as few as six groups -- social problems, child rearing, political-military, old age, mental health, and human engineering. (See Table 5) This arbitrary, after-the-fact classification does suggest that the concept of what is newsworthy in psychology is rather narrow.

Still, while most reporters agreed that these categories were likely to be covered, and were willing to add other categories, the reporters did not seem to be consciously categorizing the material as they made their selections. As two of the reporters said, one just "plays it by ear". The reporter seems to select a combination of what seems important to him and what he thinks will interest the hypothetical reader.

Table 5

Studies Covered, By Categories

Social problems	5
Child raising	9
Political-military	10
Old age	4
Mental health	10
Human engineering	7
	45*

* Unclassified are two studies -- one by Dr. Leslie Malpass on the effect of the size of audience on the response to certain types of humor, and one by Dr. Ward Edwards, on decision making.

By comparing the ten convention items which were covered by the most reporters, with the ten items which followed them on the convention program, it is possible to find reasons why one group was judged to have "news interest" by a majority of the reporters while the other was completely passed over, and to isolate some of the more important elements in "news interest".

The items which were most often reported were a speech by Dr. Lee J. Cronbach on the shortcomings of certain job placement testing methods; symposiums on alcoholism, old age (pre-retirement counseling), delinquency, and highway safety; a study by Dr. Herman Feifel on attitudes toward death; a study by Dr. Leonard Vander Linde concerning the relation of repressed hostility and migraine headaches; a study by Dr. Harry Grayson and Dr. Leonard Olinger on stimulating "normalcy" in psychiatric patients as a possible indication that the patient will respond to treatment; a study by Dr. E. Lowell Kelly, Dr. Charles Westoff, and Dr. Elliot Mishler on psychological factors in fertility, and a speech by Dr. Kelly on consistency in adults over a 20-year period.

The ten items which followed these in the program (omitting those which were covered) were a speech by Dr. Richard Husband on college achievement as a predictive of success; symposiums on personality and higher education, on the limits of projective methods, on the role and training of clinical psychologists, on cultivating professional interest in students and on recent contributions to the psychology of disability; a study by Dr. Walter Crockett and Dr. Thomas Meidinger concerning perception and authoritarian characteristics; a study by Mrs. Evelyn Mason, Dr. Neal Middelcamp and Dr. Donald Thurston on late effects of lead poisoning; a study by Dr. Morton Bard and Dr. Ruth Dyk on the significance of beliefs regarding the cause of serious illness, and a study by Dr. Earl Schaefer and Dr. Richard Bell on attitudes toward child-rearing and the family.

In looking over the ten stories most used, it is evident that the reporters would agree with one author's idea that the newspaper reader "is interested in science to the extent that it may affect his life. . .". (10) Nine of the ten items deal with problems which are part of most people's conversation, if not their lives. Only the Cronbach speech, which involved a high degree of controversy, fails to relate closely to everyday life.

Of the ten items which were not used, five would have had only a limited audience as they were concerned with either professional problems of psychology or with the college community. The study on the effects of lead poisoning was rather limited in appeal.

However, the items on the authoritarian personality, significance of beliefs regarding the cause of serious illness, attitudes toward child-rearing and the family, and disability do not seem to differ greatly from the ten used. While none of these subjects have received as much attention in the daily papers as traffic safety or delinquency, superficially they seem to have as broad an appeal as migraine headaches or attitudes toward death.

Thus it appears that the amount of coverage in San Francisco was determined by the capacity of the reporter assigned, working within the general limits set by the size of his paper. The reporter's capacity was increased by the efficiency of the pressroom in making the material more easily available and by the cooperation of the psychologists in the interview sessions.

These factors also affected the amount of coverage outside San Francisco. However, a more direct factor for the newspapers depending on the wire services was the great volume of material with which the wire stories had to compete.

What was covered seems to have been determined by the rather ill-defined term of "news interest". "News interest" in psychology seems to equal the reporter's idea of how the science may affect the reader's life and the element of controversy.

The Treatment

> Publicity is not good enough just because it is plentiful and not bad. One attitude toward publicity may be summarized as: (a) Let's get a lot. (b) Let's keep it clean. (c) How much did we get?
>
> Another attitude may be summarized as: (a) What do we want to say? (b) What are people interested in? (c) At what points can our messages meet those interests? (d) How well did we do?
>
> Accepting this second orientation does not mean losing sight of the primary function of a convention which is to educate and stimulate each other. It does mean, however, that the public information program moves from the status of a frill to the status of a purposeful educative function for the benefit of the general public as well as for psychology. (11)

If a "purposeful educative function" is the goal of convention coverage, then in evaluation some account must be made for quality. In this study, each psychologist whose presentation was covered in detail was sent copies of the newspaper articles written about his part in the program. The psychologist was asked to comment on the accuracy of the articles, and was invited to make other comments concerning his contacts with the press. If more than one psychologist was involved in a presentation, the letter was sent to the psychologist most often mentioned or quoted in the articles.

Twenty-two of the 33 psychologists responded. The 22 who responded were involved in 54 of the 97 articles carried by the San Francisco papers on technical material, as well as three stories carried by the New York Times. (12)

In commenting on accuracy, 12 of the 22 psychologists found minor errors in coverage, such as stating that the subjects for a study came from the San Francisco Bay area, when they actually came from all parts of California, or as giving the wrong psychologist credit for a study. These latter errors are not particularly significant for this study, as they did not essentially affect the meaning of the articles.

More serious is the opinion, expressed by six of the psychologists, that at least one of the reporters missed the point of their presentation. The six criticisms involved eight articles.

An example of how the wrong conclusions were drawn was the handling of a study on the evaluation of anti-social behavior by delinquents. The researcher had hypothesized that delinquents evaluate anti-social behavior differently from others in their society. To test this hypothesis he had a group of 32 delinquents, a matched group of non-delinquents and a group of male teachers rate 70 statements of specific crimes according to relative seriousness. The results of the study showed no significant differences between the three groups.

The reporters did not interview the author but, rather, wrote their stories from a press release written by Amrine. Amrine's release began:

> San Francisco, Sept. 3--Many students of crime have assumed that delinquents break laws or fail to conform to society because they do not see society in the same way as their conforming brothers. In other words, it may be said that the theory held by many is that there is an 'outlaw law', or 'there is honour among thieves', in the old saying, but the trouble is that it doesn't follow the lines of the law of the land.
>
> A study of how delinquents evaluate anti-social behavior, which denies this theory was presented . . .

Then Amrine went into the findings of the study.

However, the news stories were greatly condensed, and the introductory phrasing (which the author did not use) was made into the central feature of one story. The news item began:

> In another of this morning's lectures . . . it turned up that 'There is honor among thieves'.
>
> This honor, however, is no different from that of the law-abiding . . .

This article was objected to by the author, because all of the items rated were criminal by definition, and therefore the study did not involve differences between right and wrong, but rather differences between wrongs.

This example illustrates the ease with which material becomes distorted as it passes through several filters. It also shows the danger of using striking phrases in simplifying material.

The great bulk of criticism revolved around the attempts of the reporters to clarify their stories. Seventeen of the 22 psychologists cited examples in which reporters slanted their articles in a manner which the psychologists considered inaccurate. Whether the articles "generalized the data beyond the scope of the study", "exaggerated the degree", "stated without qualifications", "oversimplified", "overstated", were "too selective and slanted", or were "too categorical, too positive", they were criticized, not for being completely erroneous, but for inaccurately attempting to achieve clarity. These inaccuracies may be seen as reporters' responses to the demand of the newspaper that copy "have a point". The position of the reporter is not an enviable one, for he must satisfy the demands of the media, while attempting to stay within the bounds of scientific accuracy -- a delicate task at best.

One psychologist, who gave a report involving the effects of mass media, felt that the features of his study which were unfavorable to the mass media were ignored. This "selective perception" on the part of the reporters has more serious implication than the more simple attempts at clarity.

Three psychologists felt that value judgments were made by the reporters which were not part of the studies; one mentioned that a reporter's account of his experiment tended to perpetuate the unfavorable stereotype of the psychologist, and another felt that a reporter had handled his material in an overly light manner. Only four psychologists complained of being misquoted.

Newspaper headline practice drew at least one criticism. An article on the symposium on delinquency was given the headline, "Delinquents Defended at Science Meet". While the story was acceptable to the psychologist, the headline was highly objectionable. Responsible, of course, was an anonymous headline writer who produced a "cute" alliterative headline which fitted the one column slot.

While the psychologists were asked to comment primarily on accuracy, the letters also gave some insight into other aspects of the reporting process. While seven psychologists commented favorably about their contacts with the press, at least four raised some objections to the reporters' methods. These objections related to the interviews, as they felt that they were being grilled, or that leading questions were asked. Whether these complaints were due to overly agressive reporting, or to the uneasiness of the psychologist in a strange situation is impossible to determine in this study. It does indicate, however, that the interviews were not always viewed as favorably by the psychologists as by the reporters, and that some were more successful than others in terms of establishing an informal question-and-answer basis.

One psychologist felt that interviewing the author was likely to be much less satisfactory than getting the author to prepare a release. However, the two psychologists who reported having no contacts with the press in San Francisco (their articles were written either from the abstracts, or from press releases) did not think their studies had been covered accurately, and one suggested that either the abstracts be written more carefully, with the press in mind, or that the reporters be urged to talk to the author.

From the point of view of the psychologists whose findings were reported, then, the greatest sources of inaccuracy were the attempts of the reporters to give their stories meaning for the general public. In relatively few instances did they feel that the reporters missed the point -- rather they felt that they went too far to make an interesting point.

It seems that most of the difficulty in the reporting process came from the divergent aims of the psychologist and the reporter. The psychologist, interested primarily in the search for truth, makes news only incidentally. The reporter's primary concern is in reporting material which will interest the general public. Distortion of the scientist's truth occurs in the reporter's effort to make the material meaningful and interesting to the reader. While this basic divergence between psychologist and reporter cannot be resolved, better understanding of the demands of mass media, on the one hand, and of science, on the other, may help to ease the friction.

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2. San Francisco *Call-Bulletin*, September 1, 1955.

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4. *Ibid.*

5. San Francisco *Examiner*, September 3, 1955.

6. *Ibid.*

7. *Ibid.*, September 4, 1955.

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10. Charles Clayton, *Newspaper Reporting Today*, p. 344.

11. From the report of the APA subcommittee on the convention public information program, 1954.

12. Each mention of a convention item is considered to be an article. Combination stories, which include reports on several studies, are divided by subject.

TWO STUDIES ON THE COMMUNICATION OF SCIENTIFIC INFORMATION

Norman McKown

Dr. McKown is now director of Institutional Research at Oregon State University in Corvallis. He reports here two studies, one on the effect of "personifying" the communicator, the other on the effect of making report style more personal and informal.

TWO STUDIES ON THE COMMUNICATION OF SCIENTIFIC INFORMATION

by

Norman McKown

I. CLARITY OF IMAGE OF COMMUNICATOR AS RELATED TO RECALL OF FACTUAL CONTENT

Introduction

The influences which the source of a message has on its reception by an audience have been well-charted in some areas, not so well explored in others. The best-known work, of course, on source effects in communication, was the pioneering work of Hovland and his associates (1, 2) who demonstrated that an audience's estimates of a source's credibility and their affective responses toward him modify both the amount of attitude change which his persuasive message will produce and the permanence of that change through time.

The influences which a communicator might have on an audience's learning and retention of a message's factual contents are not so well known. On the face of it, it is reasonable to assume that an audience's attitudes toward a source should influence their reception of the message. Quite simply an audience should pay more heed to the factual contents of a message from a creditable communicator than to the contents of an identical message from a source who is for some reason suspect.

But no matter how well an audience receives a message initially they will forget its contents with the passage of time assuming that they are not exposed to the communication again.

But, a priori, there is no clear theoretical relationship between source characteristics and the rate at which content will be forgotten. According to contemporary theories retention is thought to depend upon such factors as repression, interference, or the resolution of stress. None of these variables admits easily of source influence so while the connection between a source and learning may be a relatively straightforward matter there is no obvious link between the source and his audience's retention of his message. The work of Hovland, in fact, explicitly assumes that source characteristics do not influence an audience's retention of content.

But since source characteristics do influence the lasting effectiveness of persuasive messages it is reasonable to assume that they might also influence the retention of factual content. Following this, it should be expected that the contents of a message from a creditable source would be remembered better than would the same material from a disreputable source. It can be hypothesized also that the amount of content which an audience will retain depends upon how much affect they generate toward the source when they receive his message.

This chapter presents some data which tested these two hypotheses in the setting of a common type of communicative relationship, that of a written message whose source is not present at the time it is received by its audience.

The Data

The data were obtained from an experiment originally designed to test the effects of selected style variables on the learning and retention of factual information. The stimulus material for the experiment was a written account, some 880 words in length, of the background and problems of a geophysical research project which aimed at the development of a shaped, explosive charge which could be used to perforate oil well casings. The author of the message was said to be a "research scientist" who was unnamed and otherwise unidentified. Versions of this message which differed only with respect to their style of writing were presented to randomly selected groups of students, 139 in all. Subjects were instructed to read the message and were told only that it was part of a study on the communicability of scientific writing. They were not told beforehand that they would be asked to answer questions about its contents.

Immediately following their exposure, however, subjects were presented with 20 recognition items which required them to select from among four alternatives the one answer which was correct in light of the material they had just read. Four weeks later, without either forewarning or additional exposure to the message, they were presented with the same 20 items and again asked to check what they thought was the correct answer to each. Differences between their first and second scores on this test were, therefore, a measure of how much of the message's contents they had retained.

The style variables produced significant differences in initial learning of content; they did not, however, produce significant differences between the experimental groups in the amount of the message's contents which they retained between tests.

A test of the effect of source credibility upon retention of content was made possible in this way: after completing the first test, subjects were asked to rate the author's objectivity. On the basis of their responses to this question they were divided into two groups: those to whom the source was credible and those for whom he was not. Average scores on the first test of content did not differ significantly for the two groups which were formed in this fashion. So, a comparison of average differences between the first and second scores was a test of the influence of source credibility upon retention. If the hypothesis that source credibility enhances retention was justified, then the group for whom the author of the message appeared credible should have had a significatnly smaller mean difference.

The amount of affect which the subjects developed toward the source -- or in the case of a written message, the strength of the image which they developed of him -- was measured in this way: after the first test, subjects were also asked to agree or disagree with nine statements about the author. These items dealt with his intent, his efforts to communicate, his apparent capability, and his thoroughness. Each item included an offset response category, "I'm not sure". Since the stronger the image a person has of another individual the more willing or able he feels to state his opinion explicitly, the number of times the subjects did not evaluate the source by checking this answer was taken as a measure of how strong an image they had of him after reading his message.

The subjects were then divided into two new groups by dichotomizing the distribution of "I'm not sure" responses at the median. Those who had made this response once or not at all were considered to have a strong image of the source; those who made from two to seven such responses were considered to have a weak image of the source.

Again, the mean scores of these two groups on the first test of content did not differ significantly, so a comparison of their mean differences between the first and second scores allowed for a test of the hypothesis that the stronger the image which an sudience has of the source the more contents of his message they should remember.

The Findings

Source credibility. Table I shows the mean differences between the first and second tests of content for the two groups formed on the basis of the objectivity which they attributed to the source. Although those who were favorable toward the source in this respect did remember more of his message than did the ones who viewed him as less credible, the difference is not significant. On the basis of this, then, source credibility did not influence retention of the message's factual contents.

Table I

Mean Differences Between Scores on First and Second Tests of Content (low score = greater retention)

For Ss who rated the Source as:	N	$\overline{X}$	
Objective	85	4.69	S.E.D. = .37
Not objective	54	4.91	Not significant

Strength of image. As can be seen from Table II there were significant differences in retention between the two groups which were formed on the basis of image strength. Subjects who gained a strong image of the source at the time of their exposure to the message remembered significantly more of this message than did those whose image of the source was weak.

Table II

Mean Differences Between Scores on First and Second Tests of Content

For Ss with:	N	$\overline{X}$	
Strong image strength	71	4.31	S.E.D. = .29
Weak image strength	68	5.27	$p < .01$

In addition, to see whether or not image strength operated differentially with respect to source credibility, subjects were then further divided into four groups on the basis of their classifications on each of these variables. An analysis of variance test was performed on the mean differences of these groups which are shown in Table III. The results approach over-all significance. However, the interesting result is that a strong source image coupled with an unfavorable opinion of the source's objectivity seems to have produced greater retention of content than a strong source image and a favorable estimate.

Table III

Mean Differences Between Scores on First and Second Tests of Content

For Ss with:	N	$\overline{X}$	
Strong image and			
Source objective	53	4.45	
Source not objective	18	3.89	
			F = 2.61
			$p < .07$
Weak image and			
Source objective	32	5.09	
Source not objective	36	5.42	

Discussion

On the basis of these findings it appears that source credibility does not influence an audience's retention of a message's factual contents. However, their retention through time does seem to depend upon how strong an image of the source the audience is able to form at the time they receive his communication.

On a practical level this suggests a number of implications for effective communication. First off, it suggests that any communicative device which serves to personify the source - and thus allow the audience to develop greater affect toward him - will enhance the effectiveness of his message through time. For example, an oral message should have more lasting effectiveness than the same message presented in writing simply because in the former case the audience would have a greater number of cues upon which to form an image of the source. With written communications it should be that any device which helped to personify the source would increase the effectiveness of his message; the use of personal pronouns, or an accompanying picture of the source, for example, should enhance retention by contributing to the formation of a strong source image.

In a more general sense, these findings suggest that the direction of an audience's attitudes toward a communicator may be less important for their retention of his message than the intensity of their attitudes. Equating image strength with the over-all intensity of an audience's attitudes toward the source, it may be that an audience which developed very strong negative attitudes toward a communicator would remember more of his message than would an audience which had mildly favorable attitudes toward him. If this is the case, the effective communicator is one who makes a strong impression, good or bad, on his audience when he delivers his message. A further interesting point is that the source who is interested in producing lasting effects would seemingly do better to create a strong negative image than either a weak image or a weak positive one.

Finally there is the basic matter of why source characteristics should influence the retention of factual material in the first place. Certainly, as mentioned earlier, an audience's reactions to a source do not fit into our current theories of the factors which influence retention. It would be presumptuous at this point to suggest that there are new dimensions which these theories have not yet accounted for; yet, if these findings are duplicated this possibility would of necessity have to be explored. Clearly further research in this area should be fruitful.

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II. REACTIONS OF A SCIENTIFIC AUDIENCE TO NON-TRADITIONAL STYLES OF REPORT WRITING

Introduction

Traditionally, scientific audiences have had firm, often militant, expectations that scientific and technical communications adhere to the canons of the "scientific style" of writing. Hallmarks of this style are impersonality, passivity, straightforward presentation and, in general, a lack of embellishment. Interest-arousing or sustaining devices are not usually among the desiderata of scientific writing.

If these canons are truly universal, gains in readership resulting from the use of interest-arousing techniques probably would be offset by readers' negative reactions. But, on the other hand, if the stylistic demands of scientific audiences are somewhat flexible, then it should be possible to increase readership, and possibly comprehension, of scientific communications by the use of stylistic factors. The basic question to ask, then, is whether or not a scientific audience would accept such stylistic departures to begin with.

This chapter presents the reactions of one scientific audience to two such departures in a technical publication: the use of both personal pronouns and an informal, rather "light" style, as interest-arousing devices. The findings cannot, of course, be generalized beyond one audience and one communication, but they do suggest what might be found in similar situations.

The Communication and the Audience

The document in question was a technical manual written to acquaint scientific newcomers to nuclear field tests with the problems, technical and non-technical, they could expect to encounter in weapons testing. If the manual was successful -- i. e. read and comprehended -- its scientific audience could go to the field forearmed with a knowledge of the problems of instrumentation, post-shot recovery of data, etc.

The document had 15 chapters, 172 pages. Eight chapters were devoted to the technical aspects of conducting nuclear tests; seven discussed operational phases of field tests -- on-site construction, transportation, and the like. In all, there was a sizable amount of technical information to be read if the reader were to be adequately prepared for nuclear field tests.

Stylistic Departures

As noted, the manual contained two departures from "good" scientific writing. First, personal pronouns were used liberally throughout. As an example the following statement was made in a discussion of instrumentation:

> If you use rubber as a sealing agent, be certain to use a synthetic rubber at Eniwetok . . . . Remember that the more you seal a shelter the greater the heat dissipation problem.

More traditional phrasing would have been in terms of "If rubber is used . . ." or "The more a shelter is sealed . . .".

Informal, sometimes humorous, writing was the second, more drastic stylistic innovation. Each chapter opened with an informal paragraph which was clearly intended to capture the reader's interest. This was followed by a straightforward account of the relevant technical information. A few examples give the flavor of these passages.

The opening chapter, "The Field Experiment", started:

> You have a project, you have the green light, and you have just been received into that stalwart fraternity who march resolutely to the blistering sands of Nevada and the soggy atolls of the Marshalls, on alternate years, to measure the effects of nuclear weapons. If this is your first field junket you'll find conditions very different from the laboratory. If you've been on field tests before, but never on nuclear field tests, you'll find a number of peculiarities. If you've been out on nuclear field tests before you can stop here. You are probably only too well aware of these peculiarities.

A chapter about data-recovery opened:

> There are no cooks more eager to look at their concoction once the cooking time is over than are experimenters in weapons effects tests. Early entry is essential in some projects . . . [and] . . . somewhere along the line the project should decide what is to be gained by early entry and if this gain offsets the risk of undue exposure to radiation . . .

The section on meteorological conditions began:

> There are five seasons in the Marshalls, as there are in Nevada: fall, winter, spring, summer and test. Test

> season generally comes in late spring and early summer because of the stability of the climate at that time. (This is what they say, but everyone knows that although we've harnessed the atom no one has saddled the weather.)

Also, informal writing of this type was used occasionally in the body of the text as were a relatively small number of humorous "asides". As with the introductory paragraphs their purpose was to maintain the audience's interest in the course of reading a great deal of technical information.

Evaluation of the manual

Primarily to obtain readers' reactions to the manual's technical content, a self-administered questionnaire was sent to about 200 individuals in several public and private organizations which were to participate in weapons tests. But, personal pronouns and informality were regarded as significant innovations which conceivably could have disturbed the audience. So, additional questions asked for their reactions to them.

There were 141 questionnaires returned. Of these, 98 were from scientists and scientist-administrators (e.g. "Supervisory Physicist"), 43 from military project personnel.

Findings

Personal Pronouns

Three questions dealt with the use of personal pronouns in the manual. Responses to the first which dealt with their acceptability were:

> "Are personal pronouns used excessively, e.g. 'You will find that . . .' (instead of 'It will be found that...')?"

6 per cent replied "Definitely Yes" and "Yes".
23 per cent replied "Not particularly".
70 per cent replied "No" and "Definitely No".
1 per cent did not reply.

Probably the 6 per cent who were negative objected not merely to the frequency of personal pronouns, but to their presence in the first place. But the point to note is that 70 per cent were favorable and another 23 per cent were at least not negative. What these responses would have been had the frequency of personal pronouns been significatnly greater cannot, of course, be told. It does seem safe to conclude that a sizable majority would not object to the moderate use of personal pronouns in similar documents, however.

Going on from this, respondents could make an evaluation of this kind with varying intensity. Generally, the more intense their reaction the more prone they would be to judge the entire manual in terms of their reaction to personal pronouns. The following question, therefore, was asked of them:

> "Does the use of personal pronouns detract from the over-all effectiveness of the manual?"

1 per cent replied "Yes, quite a bit".
1 per cent replied "Yes, somewhat".
14 per cent replied "No, not very much".
83 per cent replied "No, not at all".
1 per cent did not reply.

So, it seems that respondents' favorable attitudes toward the use of personal pronouns are firm, since 83 per cent replied without qualification that personal pronouns created no distraction. With the 14 per cent who gave the qualified answer "No, not very much", 97 per cent of the group found personal pronouns to be no noticeable source of irritation.

Because personal pronouns were used in both technical and non-technical sections of the manual, a third question asked respondents about the appropriateness of this device vis-à-vis the two types of content. The results were:

> "Do you think the use of personal pronouns is acceptable?"

71 per cent replied "In both technical and nontechnical sections".
23 per cent replied "In both, but sparingly".
4 per cent replied "Only in nontechnical sections".
1 per cent replied "In nontechnical sections, sparingly".
1 per cent replied "Not at all".

Probably the 23 per cent who expressed caution would object to anything which approached a monologue but, as can be seen, altogether 94 per cent of the respondents found personal pronouns to be no great problem in either technical or nontechnical sections of the manual.

Informality of Writing

Three similar questions dealt with the problem of informality. Responses to the first were:

> "Apart from personal pronouns, are some sections of the manual written too informally?"

1 per cent replied "Definitely Yes".
7 per cent replied "Yes".
23 per cent replied "Not Particularly".
47 per cent replied "No".
21 per cent replied "Definitely No".
1 per cent did not reply.

Roughly the same pattern of responses was found here as was found in the items about personal pronouns: 68 per cent replied that informality was not excessive, 23 per cent took a mildly favorable position, 3 per cent said that informality was excessive.

Asked if informality of writing detracted from the over-all effectiveness of the manual, respondents replied:

> "Does this (informality) detract from the over-all effectiveness of the manual?"

3 per cent replied "Yes, quite a bit".
4 per cent replied "Yes, somewhat".
13 per cent replied "No, not very much".
80 per cent replied "No, not at all".

Here again the same pattern of responses as was the case with personal pronouns. With the 13 per cent who felt informality not a very serious distraction a total of 93 per cent were generally favorable.

So far as the use of informal writing in different types of content was concerned, respondents expressed themselves as follows:

> "Do you think that an informal style of writing is acceptable?"

77 per cent replied "In both technical and nontechnical sections".
17 per cent replied "In both, but sparingly".
3 per cent replied "Only in nontechnical sections".
0 per cent replied "In nontechnical sections only".
3 per cent replied "Not at all".

Here 94 per cent of the group did not object to informality, used sparingly, in both kinds of material, a further indication that informal writing was not greatly irritating.

General Comments

An open-ended question, "Do you have any comments or suggestions about the way in which the manual is written?" invited subjects to express their general feelings about these two stylistic innovations. Over half (76) rose to the bait; interestingly, none of their comments dealt with personal pronouns. Informality of writing seemed to be a more radical departure from what they had expected in this type of communication.

Of those who volunteered comment, 80 per cent expressed unqualified acceptance or praise for the informal writing, 11 per cent accepted it in principle but took exception to particular instances in the manual. Only 9 per cent rejected it.

The content of the replies suggested some of the functions which this audience, at least, imputed to an informal style of writing in this type of communication. Apart from straightforward expressions of approval such as "well done", "very good", some typical favorable comments are quoted below:

> The informal style leads to easier, more enjoyable reading. The reader's interest is captured -- quite a difference from the usual manuals which required dogged perserverance. (Physicist)
>
> It's very interesting to read, and as such, will be used more than if it were written in a formal manner. (Chemist)
>
> It's refreshing to read something written in language that is not stuffy. This stimulates continued, pleasurable usage of the manual -- the most important goal in the publication of a manual of this kind. (Project Administrator)
>
> The informal style. . . caused me to read more of the manual than I normally would read. (Military Project Officer)

And a rather plaintive note from another physicist:

> Please do not change the style. We have too many other dull things to read.

If these remarks are representative of all the respondents who were favorable to its use it would seem that informality -- and by further inference, other interest-arousing techniques -- can be effective in this type of communication. Whether or not it would lead to greater assimilation of content is for now a moot point. At least many of these respondents were sufficiently impressed to think that it would.

Note, too, that respondents tended in their spontaneous comments to characterize the manual as a whole as "interesting" on the basis of what were actually very few instances of informal writing. The administrator who commented, " . . . It's refreshing to read something written in language that is not stuffy", imputed to the entire manual the interest which was generated for him largely by short introductory paragraphs to each of its chapters. Apparently this rather small innovation was enough to make the entire document stand out in contrast to this audience's usual fare.

The few negative comments give a suggestion of the limitations of interest-generating devices. For example:

> Perhaps a few humorous 'asides' could be eliminated, although most are good. (Biologist)
>
> Informality should not be carried to the point of cuteness. . . (Chief, Effects Analysis Section)
>
> Too many instances of derogatory remarks. Informal technical writing is very effective, but it requires a light touch. . . (Military Project Officer)

None of these openly rejected informality in principle. But, they do suggest a negative reaction to informality used for its own sake. Also, they suggest this point: if a reader is able to view informality as a device used deliberately by the writer to ease the job of reading, then it can be effective. That is, so long as it is directly and obviously related to the job at hand -- i. e. the reading and comprehension of a body of factual material -- informality could do a great deal of good. But, by contrast, when the writer indulges in informality only for the sake of being light or humorous, then his audience may come to suspect he is less interested in communicating than he is in indulging his whimsies. Likely, they will react accordingly.

Basically it is a communication's content which induces readership and acceptance; beyond this, interest-generating devices can increase readership. So, it would seem that while informality and judiciously used humor might not save a poor message they could make noticeable improvements in a good one.

Generality of the Data

While these data are drawn from one communicative situation, it is not unreasonable to suspect that these people's reactions to personal pronouns and informality are not unique. Similar audiences exposed to similar documents should react about the same way. The question is, What would constitute a similar situation?

On the face of it this manual was a compilation of scientific "how to do it" information. Apart from its form, however, its function for this audience was to present information which would enable them to accomplish certain behaviors or objectives -- here, successful testing of nuclear weapons. The message should have aroused the anticipation that it would be of value in accomplishing this end.

Therefore, similar reactions to these stylistic innovations should be expected in communicative situations which are functionally equivalent to this one -- specifically, where the reader anticipates that the contents of a message will be of direct use to him. The variable to take into account here is the function, not the form of the message.

Following this it is interesting to speculate about the reactions of the readers of an article in a traditional scientific journal to the use of interest-generating or interest-sustaining devices. Presumably those readers who anticipated that the information in the article would be of fairly immediate use to them -- e.g. it could be incorporated into their own research -- would react favorably. The other readers who had no such anticipation -- e.g. those who read the article for more general reasons, such as keeping well informed or because of general interest -- would most likely react differently, and probably negatively.

If this second type of reader reacted negatively, then a summation of reader reaction over all readers would probably indicate an overwhelming disapproval of stylistic innovations, simply because readers of this second type usually are more numerous than are those who anticipate direct use of the information contained in the article. No doubt the writing styles of most scientific articles are fashioned for this larger, but less interested audience.

SCIENCE AND THE PUBLIC MIND

WILBUR SCHRAMM

This paper reports in part on a survey of scientific information held by a sample of people in San Francisco, and in part on national surveys made by the Survey Research Center. Dr. Schramm is director of the Institute for Communication Research at Stanford University.

SCIENCE AND THE PUBLIC MIND

by

Wilbur Schramm

It is generally assumed that an educated man who is not a scientist should nevertheless know something of science. How much and what he should know are questions that deserve closer attention than they have received.

We are far from agreement on this question. C. P. Snow, (13) for example, obviously thinks the public should know more about science than Pendleton Herring (4) thinks they should know; and Admiral Rickover doubtless thinks they should know more than many of the defenders of our school system think they should. Because of this lack of agreement, it seems only candid at the beginning of these notes to set down the assumptions concerning a desirable level of science knowledge which the writer has made and which may color what is said in the following pages.

We have assumed that an educated man, a nonscientist, should know science in a humanistic way. That is, he should know it for his general good and as a part of his cultural heritage. He should know it as he is expected to know history, philosophy, and literature. An educated man should know the Second Law of Thermodynamics which, as Snow says, is equivalent in the scientific culture to knowing a play of Shakespeare. He should, at the very least, understand clearly such concepts as mass and acceleration which are in science about on a level with being able to read. He should understand something of the nature of science, how it comes to be, how it seeks truth by successive approximation, how it lives by what Herring calls the authority of the idea, and the quest of theory that will hold up under controlled testing and the replication of experiments.

We must concede that the great majority of modern men know all too little about history or government. But it is safe to say that they know still less, relatively, about science, and even to bring their science knowledge up to the level of what they presently know about history or government would make them more effective citizens. Few public policies today are made without some reference to science. Therefore, any effective modern government, we feel, must have a certain number of nonscientists who understand science very well, and a public opinion able to distinguish science from magic and from oratory.

This is the kind of assumption which has guided us as we have reviewed the rather scarce literature on science knowledge in the public mind.

We have found the following research studies most useful:

A 1957 survey of a national sample of U.S. adults, made by the Survey Research Center of the University of Michigan; it examines these adults' knowledge of science and their use of the mass media as sources of information on science. (14, 9)

A 1958 survey of a comparable sample, one year after the previous study and six months after the launching of Sputnik I. (15)

A 1956 survey of a sample of the adult population of San Francisco, made by the Institute for Communication Research, Stanford University, to study public attitudes toward and knowledge of science, and some of the sources of these. (5)

A six-year study of public attitudes toward and knowledge of mental health, and the problem of communicating information about that subject -- the study having been made by Jum C. Nunnally and others at the University of Illinois, 1954-59. (10, 11)

A study, now in its fourth year, of the problem of communicating to the public information about and changing behavior in child care, under the direction of Nathan Maccoby and others at Stanford University, 1957 to the present. (6)

Three studies of student images of science and scientists -- one of teen-agers, by H. H. Remmers; one of high school students by Margaret Mead and Rhoda Metraux; and one of college students by David C. Beardsley and Donald D. O'Dowd. (12, 8, 1)

A study of the press coverage of the 1955 convention of the American Psychological Association, based on observations, interviews, and content analysis by Glenn L. Wood. (17)

Unpublished studies by Norman McKown of the effect of personalizing a research report and of the process of utilization in an applied research organization. (7)

A miscellany of other articles which are only partly relevant, and poll questions dealing with science knowledge asked at various times of various samples.

On the basis of these, we suggest that the following twelve statements appear to be tenable.

1. Knowledge of science is widely, but not deeply, distributed in the United States. There are still large areas of ignorance.

Almost everyone today knows something about science, and recognizes it as an important force in modern life. In general, most nonscientists recognize science without understanding it. To them it is the thing that makes possible such esoteric behavior as space travel, is responsible for the wonderful cures physicians can perform, and is behind practical everyday wonders like automobiles and television. How it does these things is very little understood. Therefore, a certain amount of magic and myth comes to be associated with the research laboratory and the white coat. Furthermore, because a certain amount of suspicion tends to develop toward activities people do not understand, there develops the dangerous mutual suspicion and mutual ignorance between intellectuals which C. P. Snow describes in The Two Cultures. (13) That is, intellectual life tends to bipolarize between those who understand science and those who understand the traditional culture, and between them the majority of the public who really understand neither.

Unquestionably, the level of scientific knowledge is rising (as may be inferred either from a time series of studies of the lay public, or from studies of scientific knowledge in different age groups). But it is doubtful that this rise in public knowledge is even keeping up with the advance in scientific knowledge among scientists.

Dael Wolfle, in his Nebraska address, (16) listed a series of technological concepts with which, he said, the popular press and radio and television are "becoming more and more liberally larded": liquid fuel vs. solid fuel, million-pound thrust, the fall of parity, a bore hole to the Moho layer of the earth, tranquilizing drugs, the effects of radiation, genetic mutation, communication theory, negatively curved space, gravity-free state, transuranic elements. It would be interesting to present that list of concepts to a sample of the American public. It is safe to say that only a few of the nonscientist readers of the press would be able to talk intelligently about more than two or three of those concepts, whereas to most of the readers they would be little more than names, and to many readers most of them would be unfamiliar names.

In 1957, 26 per cent of a very large sample of the American public had never heard of fluoridation, 32 per cent had never heard of radioactivity, and 54 per cent (just before Sputnik I) said they had never heard of space satellites. (14) Whereas only 4 per cent had never heard of polio vaccine at that time,

7 per cent were completely misinformed about it, or knew only the name;

48 per cent knew only that it exists, is available, works against polio, and other such general statements; they knew nothing of the experimental trials, the fact that it had reduced polio rates, or, of course, how it works.

Among the 67 per cent of the public who had heard of radioactivity, in 1957,

2 per cent had heard mainly misinformation;

11 per cent had heard of it, but knew no details;

25 per cent were able to make vague statements such as, it's dangerous, it kills, it's like dust or fog from the bomb, etc.;

21 per cent were able to talk of it in nontechnical terms, comparing it to radium or to rays, etc.;

only 7 per cent had any more or less technical facts about the production of radioactivity, its effect on human beings, and the like.

In addition to the general inadequacy of scientific knowledge, there are dangerous islands of ignorance and misinformation. For example, Nunnally(11) found a surprisingly large proportion of his respondents prepared to believe that the blood of the "insane" is of a different color from that of normals. On a level somewhat more significant for public policy, there was for years a dangerous and widespread misconception in this country that scientific "secrets" growing out of basic research could be "kept". And every fluoridation election furnishes renewed evidence that the public has not learned to distinguish between the kinds of voices that speak to it in the name of science.

Information on science is unevenly distributed in the general public. The distribution, however, has a predictable pattern, and this pattern is what we should look at next.

2. An individual's education is the chief predictor of his science knowledge.

Nunnally found that the chief islands of ignorance of mental health and illness were among the older and least educated people. (11) When education is held constant, however, there is little remaining effect attributable to age, indicating that modern education has a larger component of science than education formerly had. Here, for example, is a table from our own study of science knowledge in San Francisco, (5) made in 1956. In the case of age, occupation, and education, the significances were tested by holding the other two variables constant, enabling us to say that such relationships as are established are indeed with one of the variables rather than the others.

Scale, Index, or Item	Sex	Age	Occupation	Education
Acceptance of mental health folklore, e.g., "The brains of the feebleminded are smaller than those of normals."--Guttman scale	N.S.	N.S.	White collar believes less folklore (.01)	More education, less folklore (.001)
Acceptance of heredity folklore, e.g., "A sense of good and evil is born in a child."--Guttman scale	N.S.	N.S. e	N.S.	Higher education, less acceptance (.001)
Acceptance of educational folklore, e.g., "Anyone can learn to play the piano well if he will just practice."--Guttman scale	N.S.	N.S.	N.S.	N.S.
Knowledge of psychology, e.g., "Learning requires less practice if one takes frequent rests than if one works steadily."--Guttman scale	N.S.	Younger people score higher (.01)	N.S.	N.S.
Desirable health attitudes, e.g., "Being overweight increases one's chance of having heart trouble."--Guttman scale	Women do better (.05)	N.S. e	N.S.	Better educated do better (.01)
Attitudes toward science, e.g., "One of the bad effects of science is that it breaks down people's attitudes toward right and wrong."--Guttman scale	N.S.	N.S.	N.S.	Interaction with occupation
Discipline, e.g., "Too much education makes a child a softie."--index	N.S. (Women less strict, .06)	N.S. e	N.S.	More education, less strict (.001)

continued on next page

Scale, Index, or Item	Sex	Age	Occupation	Education
Mental health knowledge, e.g., "All psychiatrists have M.D. degrees."--index	N.S.	N.S.	N.S.	More education, more knowledge (white collar group only--.05)
Public health knowledge, e.g., "Vaccination protects a person by creating a miniature disease."--index	N.S.	Older know more (.001)	White collar knows more (.001)	More education, more knowledge (.01)
Anti-intellectualism, e.g., "A person with good horse sense can get farther than one with college education."--index	N.S.	N.S. e	White collar less anti-intellectual (.001)	More education, less anti-intellectualism (.001)
Item: "When fluorine is added to drinking water, people have less tooth decay."	N.S.	N.S.	N.S. (white collar, more agreement, .10)e	More education, more agreement (.05)
Item: "Heavy smoking will make a person an easier target for lung cancer."	Women more likely to agree (.02)	N.S.	N.S.	More education, more agreement (.05)
Item: "Science will ultimately solve our social problems, like crime and mental illness."	N.S.	N.S.	N.S.	College education, more agreement (.05)
Item: "Every child can benefit from a good hard course in science and mathematics."	N.S.	N.S.	N.S.	Less education, more agreement (.05)
Item: "Using tests to tell what job a person should take is nonsense."	N.S.	N.S. e	N.S.	Less education, more agreement (.001)
Item: "Strict discipline develops a fine strong character in a child."	Men more likely to agree (.01)	N.S.	Interaction with education e	N.S.

(e means that the relationship is significant when education is not controlled)

This is a truly remarkable testimony to the importance of education in building scientific knowledge and attitudes. The table shows clearly that a large part of the age effect is really due to the fact that educational level has been increasing with each decade, and to the fact that a person with more education is likely to seek more information and more difficult information, and thus to keep up with new developments. Learning is a habit.

The importance of education is confirmed again by the Survey Research Center's national sample (14) taken in 1957. This asked four questions -- respectively, about polio, fluoridation, radioactivity, and space satellites. These formed a Guttman scale, so that it was possible to score the respondents as on a single dimension of knowledge.

Here are means computed from the demographic table obtained in this survey. The other variables are not held constant in presenting any single variable.

	Science Information Score	N
Sex		
Male	2.38	826
Female	2.06	1091
Age		
21-24	2.21	128
25-29	2.35	213
30-34	2.43	244
35-39	2.40	226
40-44	2.45	252
45-49	2.32	187
50-54	1.90	188
55-59	1.98	134
60-64	2.03	107
65 and over	1.58	229
Region		
Northeast	2.20	462
Midwest	2.25	585
West	2.46	274
South	1.92	598

	Science Information Score	N
Rural-urban		
Metropolitan centers	2.01	261
Metropolitan suburbs	2.69	241
Cities 50,000 and over	2.39	296
Cities 2,500 - 50,000	2.09	432
Places under 2,500	2.19	94
Rural	1.99	595
Religion		
Protestant	2.15	1384
Catholic	2.21	415
Jewish	2.24	52
None	2.24	47
Education		
Grade school	1.44	693
Some high school	2.16	398
Completed high school	2.68	485
College	3.01	336
Income		
Less than $1,000	1.08	145
$1,000 - $1,999	1.31	174
$2,000 - $2,999	1.76	215
$3,000 - $3,999	2.05	252
$4,000 - $4,999	2.23	268
$5,000 - $5,999	2.55	305
$6,000 - $7,499	2.66	223
$7,500 and over	2.98	280

Men thus seem to have more science information than do women, the West has more of it than the South, metropolitan suburbs have more than big cities or rural regions, but the really spectacular differences are in education, income, and age. It is probable that these are highly correlated, and that the effect actually comes mostly from education, to which age (determining when the individual went to school) and income (related closely to level of education, and often reflecting parental ability to help an individual go to school) are contributing factors.

Not only education in general, but also science courses specifically, relate to amount of scientific information. Here, from the Survey Research Center's national sample (14) is a table relating science courses to information:

Education	Science Information Score	N
Grade school	1.47	691
Some high school		
-- no science courses	2.13	223
-- some science	2.23	177
Completed high school		
-- no science courses	2.31	71
-- some science	2.75	412
College		
-- no high school or college science	2.11	22
-- high school science only	2.84	108
-- both high school and college science	3.17	207

The scientific component in the average American's education has been steadily increasing, as this table (14) shows:

Age in 1957	Proportion with High School Science Courses	Proportion with College Science Courses	N
21-24	75%	18%	128
25-29	68	13	213
30-34	64	16	244
35-39	62	16	226
40-44	55	10	252
45-49	39	8	187
50-54	35	8	188
55-59	24	7	134
60-64	21	6	107
65 and over	12	3	229

The proportion of individuals who have taken science courses also rises linearly with income. And all the groups which, as we have seen, have more science knowledge, also have taken more science courses. Men have, on the average, more science courses than women, people in the West have on the average more science courses than people in other regions, and people in metropolitan suburbs have more than people in cities or rural places. (14) Therefore, we can be fairly confident that the scientific component of a person's formal education is probably the most important key to the amount of scientific information he has as an adult.

In any case, the mass media are the chief suppliers of science information to nonscientists after their school years. Here are primary and secondary sources of science information listed by the respondents in the 1957 survey: (14)

	Primary Source	Secondary Source
Newspaper	34%	26%
Magazines	21	17
Radio	3	7
Television	22	21
No second choice	-	11
No science news mentioned	17	17
Not ascertained	2	-
More than one mentioned	-	1

(N = 1919)

Thus the newspaper is both the chief primary and the chief secondary source, television and magazines are strong sources, and only radio, among these four media, is presently furnishing comparatively little science information. Between the audiences which use the four media there is little to choose so far as level of science information is concerned. The magazine audience is slightly higher than the others, but there is little difference. However, when one sets information against primary source, considerable differences show up:

	Science Information Score					
Primary Source	0 (N = 166)	1 (N = 457)	2 (N = 460)	3 (N = 504)	4 (N = 321)	Mean Score
Newspapers	17%	31%	37%	38%	38%	2.47
Magazines	4	8	18	27	44	2.96
Radio	3	4	5	2	1	1.96
Television	9	23	27	26	16	2.31
Gets no science from media	61	32	10	4	1	1.44
NA, DK, ties	6	2	3	3	-	

Who are these persons who use magazines as their chief source of science information? They are the better-educated people, the suburban residents, the people with higher incomes; and more of them are men than women. In other words, the same people we identified before, except that they are not distinguished by age. Here is a handy table of demographic correlates (made from 14) by primary source of science information:

3. Mass media use is the second predictor of scientific information; after the school years, most of the increment of science knowledge comes from the media.

It is interesting to note that the more scientific information a person has, the more likely he is to recall some science items or article from the mass media. This table (14) demonstrates that fact:

	Science Information Score				
	0 (N = 166)	1 (N = 457)	2 (N = 460)	3 (N = 504)	4 N = 321)
Proportion of individuals recalling science items from mass media	29%	55%	82%	90%	98%

It is also worth noting that the more mass media an individual uses, the more information on science he is likely to have:

	Science Information Score				
	0 (N = 166)	1 (N = 457)	2 (N = 460)	3 (N = 504)	4 (N = 321)
Uses all four media (Newspaper, magazine, television, radio)	18%	32%	50%	60%	71%
Uses three media	38	39	35	30	28
Uses two media	25	19	12	9	1
Uses one medium	15	9	2	1	-
Uses no media	4	-	-	-	-

It seems evident that amount of scientific information is linearly related to number of mass media used. It can also be demonstrated that number of mass media used correlates strongly with many of the same variables as does scientific information -- that is, with education, income, suburban living, and (less strongly) age. The Survey Research Center study does not contain a table of information vs. media use with education held steady, and therefore it is harder to say whether media use has an effect independent of education. The intuitive answer, however, is that education predisposes individuals to use more mass media and to seek science items more avidly. If this is true, the better-educated individual will continue his growth in science at a more rapid rate than the lesser-educated individual, and the gap between them will widen.

	Primary Source			
	Newspapers	Magazines	Radio	Television
Sex	No difference	More males	More females	More females
Age	No trend	No trend	No trend	No trend
Region	Most in West	Most in West	Most in South	Most in South and Midwest
Rural-urban	Most in cities 50,000 plus	Most in suburbs	Most in rural regions	No sharp trend
Education	Slight trend toward less educated	Sharp trend toward more educated	Less educated	Less educated
Income	Middle income	Higher income	Lower income	No trend

4. Where one goes for scientific information depends on the topic and on one's own characteristics.

We have been pointing out some of the characteristics of persons who rely on each of the media as their primary source of information. Let us now hasten to say that a great deal of scientific information is gathered from personal sources, some from friends, some from professionals. Where such information is sought depends partly on the topic. Here, for example, are some results of the San Francisco science study. (5) Respondents were asked where they would go for information on cancer, on a continually sullen child, and on mental health. Then they were asked where they had gone for such information. These were the results:

would go

have been

	Cancer	Continually Sullen Child	Mental Health
Professional expert	93%	73%	94%
	10%	10%	12%
Professional publications	40	6	36
	12	8	15
Mass media	13	9	7
	59	25	39
Friends	1	3	1
	8	15	7
Own experience	1	10	1
	8	39	10
Religious adviser	1	14	7
	1	2	1
Library source unspecified	31	50	19
	1	1	1
School teacher	0	11	0
	0	2	0
Other responses miscellaneous			

It is evident that child rearing is regarded as less a matter for professional consultation than the other problems. It is a problem on which one more often relies on his own experience or on something in print. Although an overwhelming majority of all respondents said they would go to professionals if they had any of these problems, that is not where they *had* gone. Only one in ten had been to professionals. More than anything else they had depended on the mass media or, in the case of child rearing, on their own experience.

There is a difference between the readers of *medical* news and the readers of (nonmedical) *science* news. The readers of medical news and articles are more likely to be women; the readers of science news and articles are more likely likely to be men. (14) Better-educated people read more of both kinds of material, but education more sharply distinguishes the readers of science news than those of medical news. As the Survey Research Center says, "The reading of nonmedical science news is associated with a cosmopolitan and rather intellectual orientation toward news content. The reading of medical news, on the other hand, tends to be associated with a more personalized, local point of view." (14, p. 84) In other words, the reader of medical articles is more likely to be thinking what they will mean to him; the reader of nonmedical science articles is more likely to be thinking what they will mean to *us*.

5. *The more personalized and/or sensational a scientific article is, the larger its audience.*

In the spring of 1957, six months before the launching of Sputnik I, only 46 per cent of a national sample of Americans had heard of earth satellites. One year later, 91 per cent had heard of such satellites. In the six months following October 1, 1957, almost 50 per cent of the country had acquired this scientific knowledge, due to the very heavy coverage of a sensational story by the mass media.

The Survey Research Center tested a number of paired headlines, seeking to find out what characteristics of such a title attracted public interest. One of these was "Rocket ships and space travel". Many fewer people were interested in it than in "Test of new rocket for first flight to moon announced". The latter headline was immediate and specific. Similarly, "The psychology of how to raise children" was less interesting than "Will today's children be smarter than their parents?" "New scientific ways to prepare foods" was less interesting than "Foods that won't ever spoil". "The causes of depressions and hard times" was less interesting than "How you can protect your family against hard times". In general, the respondents were more likely to be interested in the story they could put themselves into.

People differ in their willingness to accept threat. We find in our television studies that intelligence, social class, and state of family and peer group relationships all help to predict the amount of escape and fantasy material as opposed to the amount of reality material which a young person will select from the media. In adult life, too, the more highly educated people -- to mention one characteristic -- are more likely to select science material which deals with threatening material. But for all persons there is a limit to their acceptance of threat, beyond which point they will tend to reject the material. Among the headlines tested by the SRC were these two: "The effects of atomic bombs on human beings", and "Will atom bomb tests affect your health?" The latter seemed more personalized and specific, but fewer people found it "very interesting" than the less personalized headline. The reason was apprently the implied threat.

In general, though, the rules that every reporter learns will stand the test of science information. If you can put something in story form, it will be read by more people. If you make it apply to the reader, more will read it. If you can be concrete and specific, rather than abstract and general, more people will read it. If you can stress the sensational elements in it (the conflict or violence or unusualness) or the human interest elements, it will be read by more people. If you can personalize it, it will be more widely read. This refers both to personalizing the meaning of the story and personalizing the author. The popularity of columns and some newscasts prove the value of personalizing, and recently an experiment by McKown (7) has shown that a research report which makes special efforts to personalize the researchers has been more widely read and better remembered in a supposedly hard-boiled military establishment.

6. The mass media tend to use these techniques in reporting science, and to select material that can be so treated.

The media are considerably justified, of course, in using techniques of science reporting that will maximize their audiences. They are justified, that is, up to the point that they are no longer adequately and accurately representing the scientific subject matter they have to cover. The most interesting test we have of this aspect of science coverage is a study by Glynn Wood of the coverage of the 1955 convention of the American Psychological Association. (17)

Wood observed, had the use of a number of tape recordings on which psychologists recorded their experiences with the reporters, interviewed the reporters as to their objectives and experiences, examined the printed coverage of the convention, and sent the stories to the scholars whose papers or speeches were reported, so that these scholars could judge the accuracy or inaccuracy of the report.

During the convention week, 420 research reports, 23 speeches, and 64 symposia were available for coverage. Less than 10 per cent -- 45 -- were reported. Most likely to be covered were the speeches; they represented well-known names. Next most likely were the symposia; they were usually handled as conflict or argument. Only 7 per cent of the research reports were covered at all. The chief research topics covered were on public problems, political matters, mental illness, and child-rearing problems. Of the total number of stories covered in the sample of newspapers, 47 per cent dealt with a local man -- that is, local to the place where the newspaper was published. In other words, the reporters were covering science exactly as they covered any other news, searching for conflict, sensation, human interest, and localness.

The coverage represented 33 psychologists. Twenty-two of these responded to the questionnaire on accuracy. Of these, 17 cited examples in which reporters slanted their articles in a manner which the psychologists considered inaccurate. Most of these instances were apparently attempts by the reporter to give the material clarity and interest. Trying to give the story a "point" which could readily be perceived by a layman, the reporters "generalized beyond the scope of the data", "exaggerated", "stated without qualifications", "oversimplified", were "too selective and slanted". Seven of the psychologists complained of the way they were grilled by the reporters, whom they considered overaggressive and sometimes downright insulting. This, too, was probably the result of trying very hard to get a publishable understanding of a research paper.

What we have just said should by no means be considered an indictment of science writers. Rather, it is intended to point out that the relation between the scientist (who is not primarily interested in making news) and the reporter (who is interested in science primarily as a source of news for the general public) is a most difficult one. If the reporter does not sufficiently understand science, we must also admit that not many persons in science understand the process of public information. It will require a process of mutual learning to create a productive relationship between these two.

7. The mass media do not apply to entertainment material the same standards of scientific accuracy they apply to advice and reportorial description.

Nunnally (10, 11) reported a most shocking finding: that despite such crackpot beliefs as we reported earlier, still over-all the beliefs of the general public concerning mental health are more like the beliefs of a selected panel of psychiatrists and psychologists than are the beliefs carried by the mass media. This was not because of the advice articles, but because of the treatment of mental health in the entertainment parts of the media -- the plays, serials, stories, comics and so forth. These were likely to represent mental illness in the most stereotyped and outdated way.

Lane, working with Maccoby, made a similar study of the child-rearing content of the mass media, using much the same methods as Nunnally. He monitored television, radio and films, and content analyzed all the printed media. He found no such startling deviations as did Nunnally, but reported that the entertainment treatments of child care in the media were consistently more authoritarian, less permissive than the advice articles; and that they simplified all problems, and avoided consideration of why something happened.

Inasmuch as science, natural and human, is a very common topic of mass media fiction and drama, this represents a serious problem. Tannenbaum and Gerbner, (3) interviewing key executives of the media, concluded that much of the trouble grows out of inadequate contact between the media and experts. Secondarily, the trouble is in the way the media look at their entertainment function -- as an effort to please, and not to worry or tax, the largest possible audience. They also reported the rather startling fact that it has been common practice with film makers, when they cast a professional like a doctor in an evil role, to present him as mentally ill -- thus avoiding a protest from doctors but not contributing to better understanding of mental illness.

8. Public attitudes toward science and scientists are generally favorable, although not very accurately informed.

Eighty-three per cent of the 1957 sample of Americans said that the world is better off, due to science. (14) What are these good effects? Forty-nine per cent mentioned improved health and medical treatment; 45 per cent, a higher standard of living; 19 per cent, industrial and technological improvements; and so forth. What are the bad effects, if any? Very few responses of any kind were elicited without probing, and then only one such answer was given very often even after probing. This was the possibility of atomic annihilation and other ills related to new weapons -- 52 per cent. Ninety-four per cent agreed with the statement, "Science is making our lives healthier, easier and more comfortable"; and only 23 per cent agreed that, "One of the bad effects of science is that it breaks down people's ideas of right and wrong".

What do people think about scientists themselves? They are "intelligent, brilliant, smart" -- 37 per cent. They are "highly educated, studious" -- 23 per cent. They are "dedicated, hard-working" -- 12 per cent. They are "socially inept, introverted, hard to get to know" -- 9 per cent; "deviants, neurotic, queer, crazy" -- 4 per cent; "have narrow interests" -- 4 per cent; "mildly eccentric, absent-minded" -- 3 per cent. Ninety per cent of the sample agreed that "most scientists want to work on things that will make life better for the average person"; 67 per cent that they "work harder than the average person"; 41 per cent that they are "apt to be odd and peculiar"; and 31 per cent that they are "not likely to be very religious people". Why do they work on science? "Discovery, challenge of the unknown" -- 29 per cent; "social value of the work", 21 per cent; "intellectual satisfaction, finding out how things work", 19 per cent; "economic rewards", only 3 per cent, and "prestige", 2 per cent. In general, a quite favorable impression, with a few unpleasant overtones.

The opinions we have just quoted are those of adults. Studies by Remmers, (12) Mead and Metraux, (8) and Beardsley and O'Dowd, (1) tell us what students think of scientists. The picture is different only in degree from that of adults. The scientist is seen as very intelligent, dedicated to his work, at the expense

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of family, social life, art, and "fun". He is devoted to his laboratory and out of touch with people. Particularly in the minds of college students the scientist is seen as somewhat unstable; cold and intellectual in his own field, he is often naive and emotional in handling social and political problems. He is brilliant, successful in his own work, essential to modern civilization, and yet he is a bit queer, a bit hard to understand, the kind of person -- one student said -- he wouldn't like to double-date with.

Dr. Mead calls this a reflection of the mass media stereotype, and pleads for more emphasis on the "real, human rewards of science". She urges that the schools begin very early to encourage student participation in, rather than merely passive watching of, scientific activities; and also that they emphasize the life sciences and living things.

One conclusion that seems to be generally drawn is that the names of individual sciences have a more favorable connotation than science or the scientific method. (8, 1) That is, people react more favorably when a physicist or a chemist, than when a "scientist" is mentioned. The least favorable term of all is "social scientist". Better to talk about psychologist or anthropologist or economist.

9. The public is interested in getting more scientific information.

Twenty-eight per cent of the national sample said they wanted more science news; only 6 per cent said they wanted less. Similarly, 42 per cent said they wanted more medical news, and only 3 per cent wanted less.

How do we interpret this? We know that science news -- unless it is something as sensational as Sputnik -- runs a poor second in readership to crime, violence, and even human interest stories. Are we dealing, therefore, with a prestige answer? Are the respondents saying what they think they ought to say?

To some extent this is probably true. And yet there is evidence of real interest. We have no reliable time series of readership measurement of science news; but such as we have indicates that readership is going up. The sale of scientific books, scientific kits, journals of popularized science, has greatly increased. On the whole, we are inclined to credit the precentages given earlier, although we are bearish as to how fast the input of scientific information can rise until the effect of increased scientific training in school is generally felt throughout the public.

Here is a table of demographic correlates (made from 14) on the desire for more science and more medical information in newspapers:

	Science Information	Medical Information
Sex	More males want it	More females want it
Age	No real trend	Slight trend to 20's and 30's
Region	Midwest most wants it	Midwest and South
Rural-urban	Smaller cities	No real trend
Education	Higher the education, more it is wanted	Rises with education, but is as strong with group that completed high school as with those who went to college
Income	Higher the income, more it is wanted	Rises with income up to 5-6, 000, then decreases (medical care easier to provide at that income level?)

10. There are some negative indicators as to what information on science should be given the public.

Meeting this indicated need for more information on science is not so simple as providing a flow of accurate fact, which is as personalized and specific as possible in order to attract general readership. As Nunnally points out, it is relatively easy to convey new information about any generally interesting scientific topic. (11) Any "seemingly authoritative and comprehensible" information is likely to be accepted. But attitudes are another matter.

Take, for example, a situation in which information must be conveyed in an atmosphere of some anxiety. This is often the case when one is talking about atomic fallout, or mental illness, or cancer. Janis found that talking even about dental caries produced an atmosphere of anxiety, and when the message was sufficiently anxiety-producing, the audience rejected it. This is the case in all such anxiety-ridden situations as we have named. There is a point beyond which the arousal of fear or unease will result, not in more attention, but in rejection. Not only will the attitudes toward science and toward the topics be less favorable, but also the receiver's mind may be prematurely closed to other relevant information.

But in any such situation there is a strong need for "the real facts". People are anxious for information, and if it can be kept below the critical point of anxiety it will probably be accepted readily. Nunnally found that when such information about mental illness was accepted, not only did it produce a more favorable attitude in general, but also it reduced the fear of mental illness and of the mentally ill. Whether or not the information is valid is outside the question; the mere act of acquiring information on a doubtful and anxiety-ridden subject leads to more constructive attitudes.

By the same token, the destruction of existing misinformation in an anxious situation may have bad effects unless it can be replaced with satisfying and valid information. In other words, a person clings to any information at all when he is anxious and fearful. If we cannot replace his misinformation with valid information he can understand and accept, if, for example, the true explanation is too complicated to explain to him, then we should exercise the greatest caution about destroying his present incorrect beliefs. Nunnally found that when people "lose" information about mental illness through counter-arguments, then they have even greater fear and distrust of mental illness, the mentally ill, and the professionals who treat the mentally ill. The time to communicate is therefore not when we know the public belief is wrong, but when we have the right answer.

We cite these instances only to suggest that there is a greater complexity about changing attitudes and behavior with respect to science than can be fully treated in a short memorandum.

11. Learning new scientific information does not necessarily set into motion a logical chain of belief, attitude, and behavior.

Scientists are constantly amazed and incredulous at irrational public responses to rational evidence. This happens in every fluoridation campaign, when the most serious and solidly based scientific evidence and endorsements are fought to a standstill by a combination of insinuations, rumor, and emotional slogans. Now that the smoke and fury of the anti-cigarette campaign is blowing away, it becomes evident that this, too, was mostly a losing battle for science.

Why do these things happen? There are a number of studies of fluoridation elections, and so far as we understand them they teach us that it is relatively easy to confuse the public as to scientific authority by citing counter-authority, and also that it is easy to turn attention from the rational arguments of science to emotional attitudes which are in no sense scientific. So far as we now understand what happened to the effort to connect cigarettes to lung cancer, the result seems to have been partly a confusion of authority, as in the fluoridation campaigns, partly a rejection of the arguments by strongly involved smokers, and partly an easing of anxiety by changing to filter cigarettes. But the point is that we must not expect scientific information, no matter how logical and convincing to scientists, necessarily to convince laymen and lead them to behave in the way one would rationally expect on the basis of the evidence.

Maccoby discovered, in the course of studies of the communication of child-rearing information, (6) that individuals who are personally involved in the subject of scientific information are more resistant to the information -- harder to gain acceptance from. For example, women who had young children about old enough to be toilet-trained were less likely to accept scientific advice on toilet training than were women who did not have young children. But once having accepted the information, the women with young children were much more likely than the others to hold to their new point of view, and to put it into effect when the time came. In other words, scientific advice at a "critical period" is harder to convey through the media, but, if conveyed, more likely to be effective.

Out of a long literature on innovation and adoption, one point relative to scientific information seems worth stating here. This is that a new scientific idea will be accepted much more readily if the people who will have to accept it are (a) brought as much as possible into the decision, (b) early and continuously informed about it, (c) given the opportunity to discuss it freely and make changes they think necessary. What happened at Compton College when instructional television was introduced by authority, and a consequent faculty revolt forced the resignation of the president, illustrates this principle from the negative side. From the positive side, McKown studied the different life histories of research which was utilized and equally good research which was not. (17) The chief difference he found was that most of the research which was finally utilized was from the beginning a partnership between the client and the researcher, with frequent communication, and with the client being made to feel himself involved in the process. But this is another large area to which this memorandum can give little attention.

12. Some actions on the part of scientists are indicated.

The picture that emerges from this review of the literature is of a wide but shallow distribution of scientific information in the public; large islands of ignorance; generally favorable though not well-informed attitudes toward science and scientists; some indication that many persons want more science news than they are getting. Apparently a person's science courses in school are the best predictor of his later science knowledge, and he gets most of his science information after the school years from the mass media. The media cover science with the same mass audience techniques they apply elsewhere, and they are not as careful about the science in their entertainment as in their advice. And finally, there are some cautions to be recorded about when to communicate scientific information to the great public, and what to expect as a result of it.

Now what can scientists do about it?

1) They can pay closer attention to school curricula in science and to the level of science teaching. The time when scientists had no reason to concern themselves with elementary and secondary

education is past. Now they have every reason to be concerned with it. It is in these early years that images of science are being formed, career plans are being made, and the foundations for adult understanding of science are being laid.

2) They can contribute to the training of science writers -- not only with the preparation of a few specialists like Lawrence or Ubell, but also with the training or retraining of a much larger group who will not restrict themselves to science writing but will have to write and edit with an understanding of science. If the competence of the mass media for handling science information could be increased by 20 per cent, then we could confidently expect the level of science understanding in the public to be increased by 20 per cent.

3) Scientists can make information about their work easy for the media to get and understand. They can smooth the contacts between scholars and reporters at conventions. Their organizations can issue interpretive release or background materials. They can establish bureaus or representatives, at least in a few large cities, where writers can come to check information or to be directed to "authorities". They can be cooperative when a publisher or an editor asks for help or checking.

4) They can be less mysterious and withdrawn about their work, at least to the extent of opening their doors to children who are interested. These children will be tomorrow's scientists and users of tomorrow's science. If they begin early to see science without mystery, and scientists as human beings without magic, their viewpoints toward science and the scientific life will be more wholesome.

5) Scientists who do applied research can assume some obligations for the contacts with the client which will prepare for the understanding and acceptance, and ultimately the utilization, of their product.

6) They can encourage the study of the processes by which scientific knowledge is conveyed and applied.

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